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NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. CLEAR LAKE DAM (INVENTORY NUMBER N--ETC(U)
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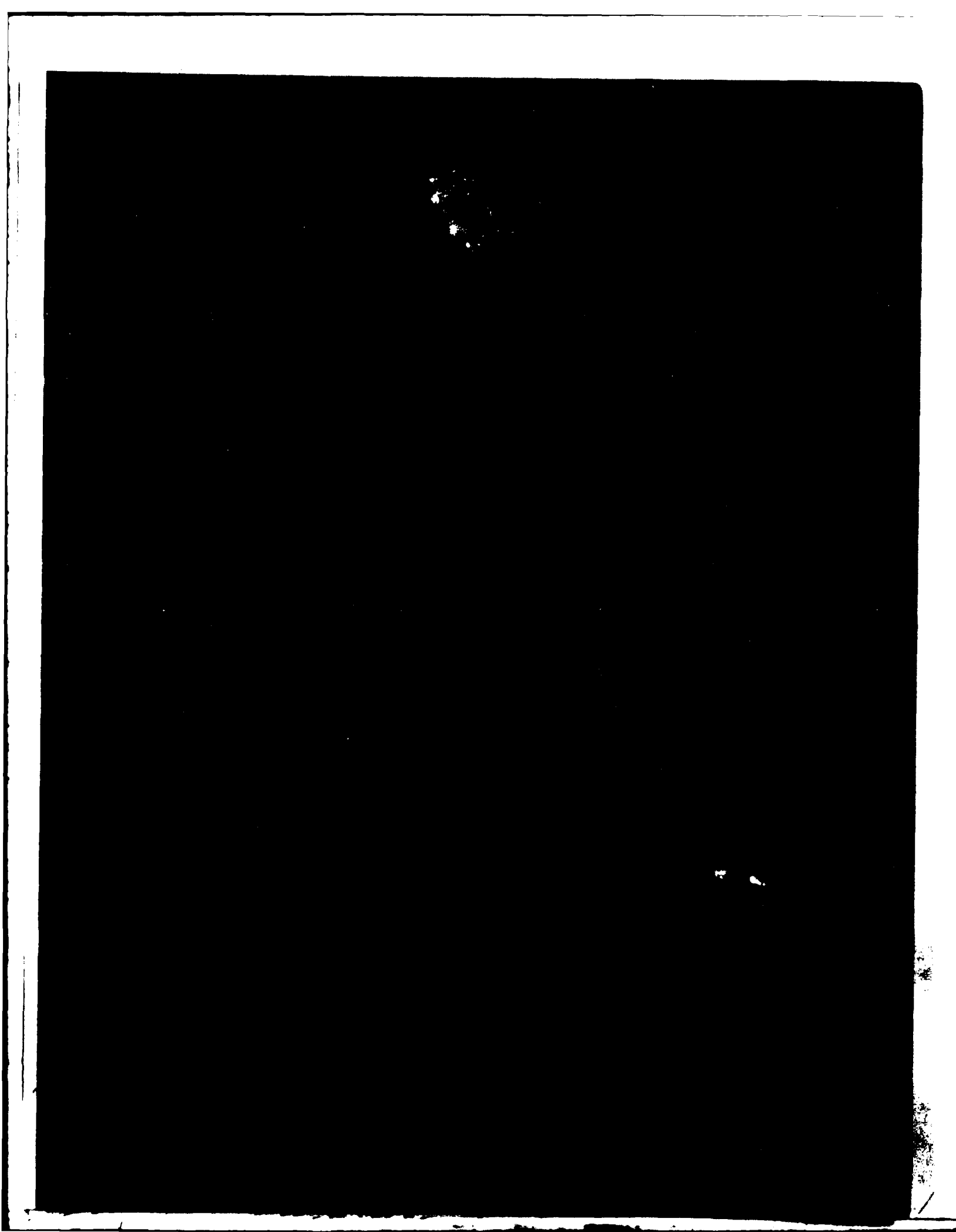
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and visual inspection of Clear Lake Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. The dam, however, has a number of problem areas which require remedial action. These areas are listed below.		

The discharge capacity of the spillway is inadequate for all floods in excess of 50% of the Probable Maximum Flood (PMF). During the 1/2 PMF event the water surface will be at the top of the dam and the outflow will be 4254 cfs. The spillway is therefore assessed as inadequate.

Within 1 year of notification the owner should complete the following remedial repairs or actions:

1. Repair the gunite portions of the spillway, spillway walls and piers. Caulk all joints where the gunite abuts to the original concrete. Clean and recaulk all spillway channel slab joints. Caulk all cracks discovered in these slabs. Also caulk the joint in the left upstream spillway wall. Monitor all joints periodically and recaulk as required.
2. Monitor biweekly the seepage at the toe of the right spillway wall and at the toe of the right embankment with the aid of weirs. Also monitor the spillway walls for signs of seepage. Provide a toe drain at the base of the embankment at the base of the embankment to collect seepage and dam runoff. Backfill all animal burrows, particularly those located directly above the seepage area and fill all future burrows.
3. Repair the eroded upstream slope of the earth embankments with heavy riprap.
4. Monitor the settlement of the ditches adjacent to the spillway bridge and repair the cracked areas of the concrete on the bridge.
5. Examine the condition of the 48 inch diameter reservoir drain and return to operating condition.
6. Monitor the tilt of the left spillway wall for signs of ongoing movement. Also, repair the deteriorated concrete at the end of the spillway channel.
7. Remove all tree growth on the slopes and at the abutments of the embankments. Provide a program of periodic cutting and mowing of the embankment surfaces.
8. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all valves and gates. Document this information for future reference. Also develop an emergency action plan.



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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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George Koch

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
CLEAR LAKE DAM I.D. NO. NY 751
200-122-130 LAKE ERIE BASIN,
ERIE COUNTY, NEW YORK.

Phase I Inspection Report
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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Clear Lake (I.D. No. NY 751)
State Located: New York
County Located: Erie
Stream: North Branch of Clear Creek
(tributary of Cattaraugus Creek)
Dates of Inspection: October 3 and November 8, 1979
January 3, 1980

ASSESSMENT

The examination of documents and visual inspection of Clear Lake Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. The dam, however, has a number of problem areas which require remedial action. These areas are listed below.

The discharge capacity of the spillway is inadequate for all floods in excess of 50% of the Probable Maximum Flood (PMF). During the $\frac{1}{2}$ PMF event the water surface will be at the top of the dam and the outflow will be 4254 cfs. The spillway is therefore assessed as inadequate.

Within 1 year of notification the owner should complete the following remedial repairs or actions:

1. Repair the gunite portions of the spillway, spillway walls and piers. Caulk all joints where the gunite abuts to the original concrete. Clean and recaulk all spillway channel slab joints. Caulk all cracks discovered in these slabs. Also caulk the joint in the left upstream spillway wall. Monitor all joints periodically and recaulk as required.
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3. Repair the eroded upstream slope of the earth embankments with heavy riprap.
4. Monitor the settlement of the ditches adjacent to the spillway bridge and repair the cracked areas of the concrete on the bridge.
5. Examine the condition of the 48 inch diameter reservoir drain and return to operating condition.

6. Monitor the tilt of the left spillway wall for signs of ongoing movement. Also, repair the deteriorated concrete at the end of the spillway channel.
7. Remove all tree growth on the slopes and at the abutments of the embankments. Provide a program of periodic cutting and mowing of the embankment surfaces.
8. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all valves and gates. Document this information for future reference. Also develop an emergency action plan.

George Koch

George Koch, Chief
Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

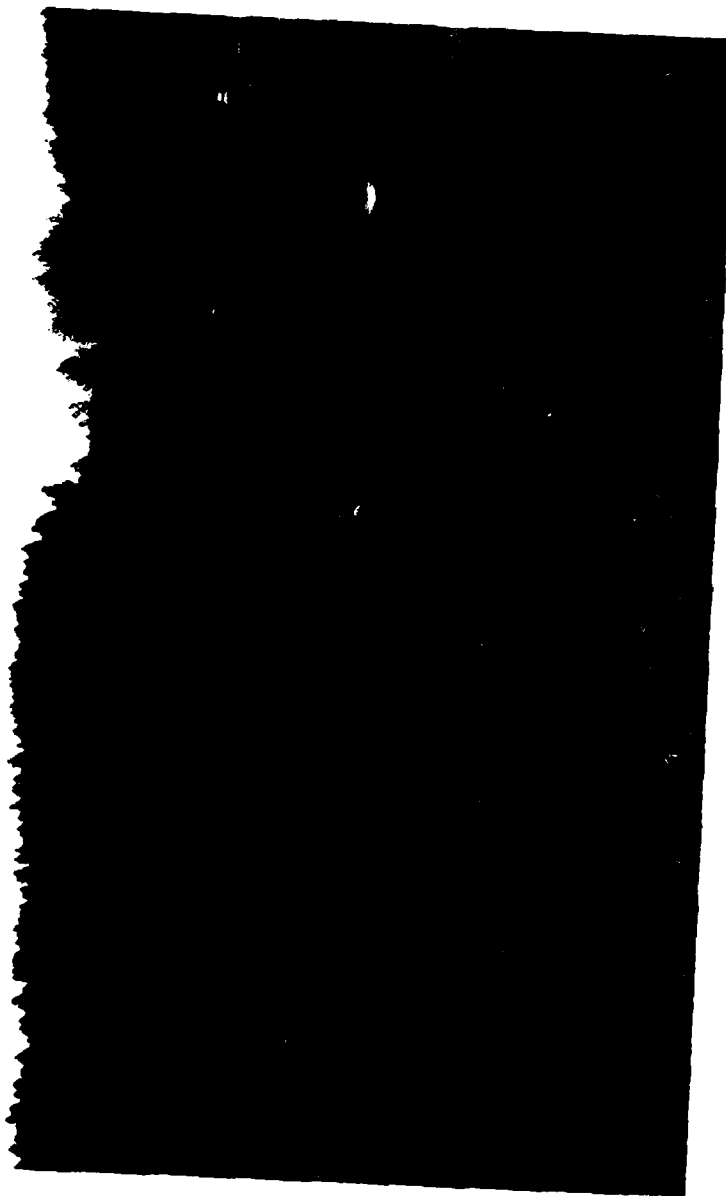
Clark H. Benn

Approved By:

Cot. Clark H. Benn
New York District Engineer

Date:

22 May 80



Overview of Clear Lake Dam
Photo #1

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
CLEAR LAKE DAM I.D. No. NY 751
DEC #12D-493 LAKE ERIE BASIN
ERIE COUNTY NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to human life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Clear Lake Dam consists of a 100 feet long concrete ogee spillway constructed between 2 homogeneous earth embankments (right embankment length = 380 feet, left embankment length = 170 feet) the maximum height of which is 30 feet above the spillway channel. The upstream slope of the earth embankments are 1 vertical on 2.5 horizontal, the downstream slopes are 1 on 2 and the crest of the dam is 20 feet wide with a roadway section of asphaltic concrete. A concrete core wall located approximately 7 feet upstream from the centerline of the dam extends through the earth embankments. This core wall is 2 feet wide at top of the wall (El. 1220, approx. 2 feet below crest of dam), 5 feet wide at El. 1178. The core wall is founded on and embedded into the bedrock beneath the dam. An intake tower located near the upstream slope of the right embankment, and a 24 diameter cast iron pipe provides the control of flow for the water treatment plant, which is located below the right embankment. An additional 48" diameter cast iron pipe used for a reservoir drain is also located under the right embankment.

b. Location

The dam is located on the North Branch of Clear Creek, a tributary of Cattaraugus Creek, approximately 6.4 miles northeast of the Village of Gowanda, New York.

c. Size

The dam is 30 feet high and impounds approximately 650 acre-feet. The dam is classified as "small" in size (25 to 40 feet in height).

d. Hazard Classification

The dam is classified as high hazard, because of its location above the water treatment plant and the Cattaraugus Indian Reservation.

e. Ownership

The dam is owned and operated by the New York State Department of Mental Hygiene, Gowanda Psychiatric Center, Mr. Thomas Armstrong, Business Manager, Helmuth New York, 14079, Telephone (716) 532-3311.

f. Purpose of the Dam

The dam provides storage for the treatment and supply of water to Gowanda Psychiatric Center.

g. Design and Construction

The dam was designed and construction supervised by the State of New York, Department of State Engineer and Surveyor in 1924. The contractor for the construction of the dam is unknown. All plans and related documents are on file at the N.Y.S. Office of General Services, South Mall, Albany, New York.

h. Normal Operating Procedures

All flows in excess of the demand for water by Gowanda Psychiatric Center are discharged through the spillway.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi.)

5.95

b. Elevations (ft./USGS)

Top of Dam

1222.0

Spillway Crest

1216.0

Invert of Reservoir Drain

1178.25

c. Reservoir (acres)

Surface Area @ Top of Dam

97.

Surface Area @ Spillway Crest

46.

d. Storage (AC-FT.)

Top of Dam

1000

Spillway Crest

650

e. Dam

Type: Homogeneous earth with concrete cutoff wall.

Length: (ft.)

550'

Upstream Slope

1:2.5

Downstream Slope

1:2.0

Crest Width (ft.)

20

f. Spillway

Type: Ungated reinforced concrete ogee section;
concrete channel

Weir Length(ft.)

91.0

Spillway Capacity: Top of Dam (cfs)

4250

g. Reservoir Drain

Type: 48" and 24" cast iron pipes with reinforced concrete inlet and outlet

Control: Manually operated valves.

SECTION 2: ENGINEERING DATA

2.1 Geology

The Clear Lake Dam is located in the glaciated portion of the Appalachian Uplands (northern extreme of the Appalachian Plateau) physiographic province of New York State. These uplands were formed by the dissection of the uplifted but flat lying sandstones, siltstones and shales of the Late Upper Devonian Period (345 to 365 million years ago). The plateau surface is represented by flat-topped divides with drainage generally southward toward the Cattaraugus Creek.

Glacial cover is generally thin, the deposits of which have resulted from glaciations during the Wisconsin glaciation, approximately 11,000 years ago.

2.2 Subsurface Investigation

No subsurface investigation could be located for the project. However, the "General Soil Map of New York State" prepared by Cornell University Agriculture Experimental Station indicates that the surficial soils are Erie Soils of glacial till origin. These soils are formed on mostly thick glacial till which is either basal or maroinic. The till is from silt stone, shale, sandstone and in some locations, from limestone with a few crystallines. These soils occupy broad, mostly smooth sloping till mantled hills. The soil is somewhat poorly drained and the permeability is generally slow. The depth to bedrock is variable.

2.3 Embankment and Appurtenant Structures

The dam was designed and construction supervised by the State of New York, Department of State Engineer and Surveyor about 1924. Selected drawings are included in Appendix G. The treatment plant was constructed in 1957 and 158 and gunite was placed over the spillway surface, walls and the spillway bridge piers.

The dam is 30 feet high and consists of 2 homogeneous earth embankments separated by a concrete gravity spillway. Two cast iron pipes (24" and 48 " diameter) carry the reservoir flow from the concrete intake tower to the treatment plant.

2.4 Construction Records

No construction records are available for this dam.

2.5 Operation Record

All operating records concerning the water supply usage of the State facility are on file at the Gowanda Psychiatric Center.

2.6 Evaluation of Data

The information presented in this report has been compiled from information obtained in part from Mr. James Cassidy, Project Chief, NYS OGS, General Engineering and Mr. Howard Segar, Plant Manager, Gowanda Psychiatric Center. This information appears adequate and reliable for Phase I Inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

The visual inspection of Clear Lake Dam was conducted on October 3 and November 8, 1979. The weather was cloudy and the temperature ranged in the forties. The reservoir level during the first inspection was at the spillway crest, and during the second was approximately 1 inch over the crest.

b. Embankments

The earth embankments are located at either end of the spillway and appear to be composed of silt and clay sized particles. (See Photos #1, 2, 3 & 14) The crest of the dam is formed by a paved highway, which is used for maintenance purposes only. The alignment of the crest appears to be good. However, 2 depressions were observed adjacent to the abutment walls of the spillway bridge. (See Photos #10 & 11) The left side depression was a maximum of approximately 8 inches in depth and was depressed for a distance of approximately 6 feet along the entire width of the crest. The right side depression was a maximum of approximately 6 inches in depth and was depressed for a distance of approximately 4 feet along the entire width of the crest. Drawing #66/5038 (See Appendix G) indicates that 2 asphalt concrete ditches were to be constructed adjacent to the spillway bridge. The depressions observed, were reported to have settled since this construction in 1966. This settlement is reflected in the cracking of the asphalt pavement (See Photos #10 & 11).

The upstream slope is very steep near the crest, then appears to flatten at the normal reservoir level. Wave action may be cutting into the slope. Some riprap appears to be present to protect the slope, but additional riprap is required.

The downstream slope is estimated to be generally 1 vertical on 2 horizontal with no evidence of sloughing, subsidence, surface cracks movement or depressions. Four animal burrows were observed near the midpoint of the slope approximately 50 feet right of the spillway buttress. Also numerous small trees and low brush were evident on the right embankment. (See Photos #1, 2, 4 & 7) Numerous large trees were growing on the left embankment (See Photos #3, 4, 6 & 9).

During the inspection of October 3, 1979 approximately 50 feet right of the right spillway wall near the toe of the slope, seepage was encountered flowing at a rate of 2 to 3 gallons per minute. The flow was clear and the area was excavated with a hand shovel to trace the origin of the seepage. The seepage appeared to be emanating from a cylindrical hole approximately 1 inch in diameter. The swale area along the toe was soft due to the seepage flow, and the general grade was such that the flow was directed toward the spillway. During the inspection of November 8, 1979, no flow was observed. It is believed that the animal burrows and trees immediately above the seepage area are responsible for the flow, since none was apparent at the second inspection and the reservoir level was nearly identical.

No drainage system or instrumentation, in connection with the earth embankment, was observed.

c. Spillway

The spillway is mass concrete with an ogee crest, a concrete chute discharge channel and a highway bridge (with 3 piers tied into the spillway) traversing the spillway. (See Photos #4,5,6&7) The downstream face was originally stepped concrete, until 1966 when gunite and baffle blocks were constructed. During the storm of September 14, 1979, a portion of the gunite was lifted up from the downstream face of the spillway. (See Photos #4 & 6). The inspections revealed that the "J" bolts holding the gunite to the original concrete were rusted and loose, and the wire mesh reinforcing was rusted through in numerous places. Cracking at the junction of the gunite and original concrete, and also at the bottom of the ogee section has permitted seepage to enter the area between the gunite and the original structure. These factors coupled with the force of the spillway flow appear to be the cause of the gunite displacement. The gunite was removed by State personnel to facilitate the inspections. The gunite removed was placed on the right embankment near the spillway wall (See Photos #7 & 9). The remaining gunite was sounded and this indicated that portions of the ogee section, highway bridge piers, and the spillway walls have separated from the original concrete. The concrete of the original structure appears sound where observed.

The concrete slabs for the discharge channel are founded on bedrock. Several of these slabs have shifted and cracked. Vegetation is growing in the construction joints, and the concrete has eroded at one location near the left spillway wall to a depth of approximately 4 inches. A crack was observed running parallel to the dam approximately 5 feet below the energy dissipators. The spillway walls are stained at several locations and calcification was also evident. (See Photos #3, 4, 6, 7, 8 & 9). Seepage approximately 2 to 3 gallons per minute was emanating from beneath the right spillway wall. (See Photo #8) The flow was clear, but rusty deposits were present in the discharge channel. The lower section of the left spillway wall was tilted inward about 1/2 inch. A 2 inch wide construction joint was noted in the upstream left spillway wall, but no unusual movement was apparent. (See Photo #13). The end of the concrete discharge channel is deteriorating and requires repair (See Photos #4 & 9). Cracking of the left abutment of the spillway bridge was observed (See Photo #12).

d. Downstream Channel

The downstream channel is bedrock formed. A highway embankment, with a concrete culvert to pass the spillway flow, is located approximately 300 feet below the dam. (See Photos #9). The water treatment plant is located on the right side of the downstream channel between the dam and the highway embankment. (See Photo #1). The downstream channel is the North Branch of Clear Creek a tributary of Cattaraugus Creek.

e. Reservoir

There are no signs of instability or sedimentation problems reported within the reservoir area.

f. Water Treatment Facility

This system consists of a concrete intake tower located in the reservoir, 2 cast iron pipes (24 and 48 inches), the treatment plant and an outlet below the highway embankment. This system is in excellent condition and all gates and valves are reported operational. (See Photos #1, 2, 7 & 9). except for the 48" reservoir drain which has not been operated for many years. It was reported that a creek developed in the 48 inch pipe and the staff at the plant was directed not to operate the drain system. The 24

inch pipe has been used consistently for this purpose. The 48 inch pipe was repaired in 1965 and is believed to be functional. However, the valve has not been operated since the repair work.

3.2 Evaluation

The problem areas observed during the inspections and the recommended remedial actions or investigations are as follows:

1. The gunite on the spillway, spillway piers and walls is deteriorated and not properly bonded to the original concrete. Remove this gunite and repair as required. Also caulk all joints where the existing sound gunite abuts the original concrete.
2. The spillway channel slabs are cracked and vegetation is growing in the joints. Remove all debris from these joints and caulk as required. Also caulk the joint in the left upstream spillway wall. All joints must be monitored in the future and recaulked as necessary to prevent seepage through the joints.
3. The seepage encountered at the toe of the right spillway wall should be monitored bi-weekly with the aid of weirs. Also monitor the spillway walls for signs of seepage. If the seepage rate increases appreciably repair measures will be required.
4. The seepage encountered at the toe of the right embankment should be monitored bi-weekly with the aid of weirs. In addition provide a toe drain at the base of the dam to collect this seepage and the run-off from the dam in the vicinity of treatment plant. The seepage may be related to percolation of dam surface runoff through the animal burrows directly above the seepage area. Backfill these burrows and monitor the dam for future burrows.
5. The steep upstream slope noted near the water line should be returned to its original design slope with the aid of large riprap to resist wave action.
6. The condition of the 48 inch diameter reservoir drain system is unknown. This system should be examined and returned to operating condition.
7. Monitor the settlement of the ditches adjacent to the spillway bridge and repair as required.
8. Repair the cracking area of the spillway bridge.
9. The tilting left spillway wall should be monitored for signs of ongoing movement. If this wall reaches a point where the tilting is critical, initiate repairs immediately.
10. Repair the concrete which has deteriorated at the downstream end of the spillway channel.
11. Remove all tree and vegetative growth on the slopes and at the abutments of the dam. Provide a program of periodic cutting and mowing of the embankment surfaces.

12. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all valves and gates. Document this information for future reference. Also, develop an emergency action plan.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 Procedures

The normal water surface is approximated by the crest of the spillway. The reservoir surface may be lower due to the demand for water by the Gowanda Psychiatric Center. This demand is supplied by a 24 inch diameter cast iron pipe to the treatment plant and originates from three 16 inch valves and sluice gates located at different elevations on the sides of the intake tower.

4.2 Maintenance of the Dam

The dam is maintained by the Gowanda Psychiatric Center. Maintenance of the Dam is not considered satisfactory as evidenced by the deteriorated concrete elements of the spillway system, the erosion of the upstream slope the extensive vegetation on the slopes of the embankments and the questionable condition of the reservoir drain system.

4.3 Warning System

There is no warning system in effect or in preparation.

4.4 Evaluation

The dam and appurtenances have not been maintained in satisfactory condition as noted in "Section 3: Visual Inspection".

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Drainage Area Characteristics

Clear Lake Dam is located on the North Branch of Clear Creek approximately 1 mile northwest of Marshfield, the township of North Collins, Erie County, New York. The total drainage area at the dam is 5.95 square miles. The Topography is generally of mild slope with many tributaries to the creek and lake.

5.2 Analysis Criteria

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers HEC-1 computer program, incorporating the "Snyder Synthetic Unit Hydrograph" method, and the "Modified Puls" flood routing procedure. The floods selected for analysis was the PMF and 1/2 PMF in accordance with the recommended guidelines of the Corps of Engineers.

5.3 Spillway Capacity

The Clear Lake spillway is an ungated ogee section, 100 feet long with three, 3' piers supporting an abandoned highway bridge. Originally a stepped structure, the spillway downstream of the crest had been recapped (1966) forming a smooth profile. Part of this cap was removed by the storm of September 14, 1979.

The spillway has a capacity of 4250 cfs at the top of dam which is essentially 1/2 the computed PMF. The dam would be overtopped by 1.7 feet at the PMF which is a flow of 9023 cfs out of the reservoir.

5.4 Reservoir Capacity

Capacity to normal water elevation is 650 acre feet. Surcharge storage to top of dam is an additional 350 acre feet, creating a total storage capacity of approximately 1000 acre feet to top of dam. The surcharge storage above spillway crest elevation is equivalent to 1.1 inches of runoff.

5.5 Floods of Record

The maximum known flood occurred on September 14, 1979. The pool level at this time was reported to be approximately 2 feet above the spillway crest. The estimated discharge for this flood is 870 cfs at an elevation of 1218. (USGS).

5.6 Overtopping Potential

The PMF analysis indicates the dam will be overtopped by 1.7 feet during the PMF. The water treatment plant would be inundated in the case of the PMF, but the spillway and highway culvert downstream would sufficiently handle the 1/2 PMF event without major damage to the plant.

5.7 Evaluation

The spillway is inadequate to pass the PMF flow of 9034 cfs, but is adequate to pass 1/2 of the PMF at 4254 cfs. The downstream channel will also pass the 1/2 PMF with minor flooding to the water treatment plant. The spillway is assessed as inadequate but not seriously so.

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

No signs of major distress were observed in connection with the earth embankment or the spillway section. However, seepage was observed at the toe of the right embankment and at the toe of the right spillway wall. In addition the upstream slope is eroding near the water line and 2 depressions were observed adjacent to the spillway bridge abutments.

b. Design and Construction Data

No design or construction data could be located concerning the structural stability of the dam.

c. Stability Analysis

A stability analysis was conducted for the concrete gravity spillway section. The results of the analysis are as follows:

<u>Case</u>	<u>Description of Loading Conditions</u>
1.	Normal Operating Conditions, reservoir at El. 1216 spillway crest, full uplift, no tailwater
2.	Same as case 1, 7.5 kips/L.f. Ice load
3.	Water at 1/2 PMF level (El. 1222) uplift as in case 1, tailwater = 6 feet
4.	Water at PMF level (El. 1224) Uplift as in case 1, tailwater = 8 feet
5.	Normal Conditions as in case 1 with seismic forces of 0.1 (seismic Zone 3)

Note: the sliding and overturning resistance of the buttress walls has been neglected. The shear strength of the cut-off wall beneath the dam has been included in the sliding stability analysis.

<u>Case</u>	<u>Factor of Safety Overturning</u>	<u>Location of Resultant from Toe</u>	<u>Factor of Safety Sliding</u>
1	2.54	20.8	8.18
2	1.97	16.8	5.70
3	2.00	19.7	5.33
4	1.87	19.4	4.78
5	2.00	17.1	5.44

Location of middle 1/3 is 10.3 to 20.7 feet from the toe.

These results indicate that the spillway portion analyzed is stable for all design conditions, and further investigation is not required.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 Assessment

a. Safety

The Phase I Inspection of Clear Lake Dam did not reveal conditions which constitute a hazard to human life or property. The embankment and spillway portions of the dam are not considered to be unstable. There are however, a number of problem areas which require attention.

b. Adequacy of Information

Information reviewed for the purposes of the Phase I Inspection report is considered adequate.

c. Urgency

The remedial measures listed below should be completed within 1 year of notification to the owner.

d. Need for Additional Investigation

No additional investigations are required at this time.

7.2 Recommended Measures

1. Repair the loose spalled and deteriorated gunite portions of the spillway, spillway piers and walls. Also caulk all joints where the existing gunite abuts the original concrete.
2. Clean and recaulk all spillway channel slabs joints and caulk all cracks notes in these slabs. Also caulk the joint in the left upstream spillway wall. Monitor these joints periodically and recaulk as required.
3. Monitor the seepage at the toe of the right spillwa- wall at bi-weekly intervals with the aid of weirs. Also, monitor the spillway walls for signs of seepage. Any appreciable increase in rate of flow will require investigation and repair.
4. Monitor bi-weekly with the aid of weirs, the seepage at the toe of the right embankment. In addition, provide a toe drain at the base of the embankment to collect the seepage and dam run-off. Backfill all animal burrows directly above the seepage area and fill any future burrows.
5. Repair the upstream slope of the earth embankments with large erosion resistant riprap.
6. Monitor the settlement of the ditches adjacent to the spillway bridge.
7. Examine the condition of the 48 inch diameter reservoir drain system and restore it to operating conditions.
8. Repair the cracked areas of the spillway bridge.
9. Monitor the tilt of the left spillway wall for signs of ongoing movement.
10. Repair the deteriorated concrete at the end of the spillway channel.

11. Remove all tree growth on the slopes and at the abutments of the embankments. Provide a program of periodic cutting and mowing of the embankment surfaces.
12. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all valves and gates. Document this information for future reference. Also develop an emergency action plan.

APPENDIX A

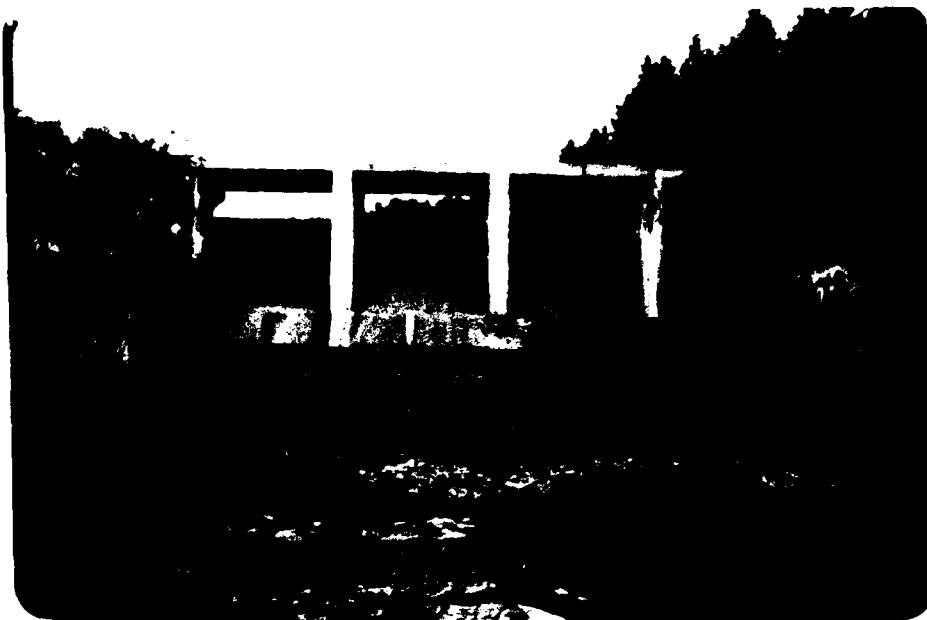
PHOTOGRAPHS



Crest of Right Embankment
Spillway in Background, Intake Tower at Left
Photo #2



Left Embankment
Photo #3



Spillway Downstream Face
Photo #4



Spillway Upstream Face
Photo #5



Left Spillway Wall
Photo #6 A&B



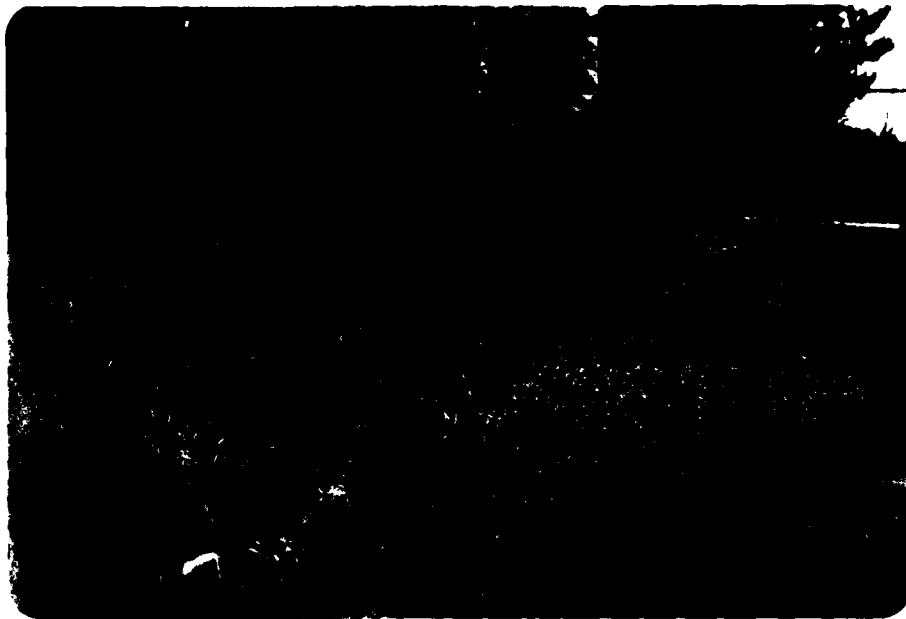
Right Spillway Wall
Photo #7 A&B



Seepage at Base of Right Spillway Wall (Rusty Area)
Photo #8



Downstream Channel
Note, Highway Embankment & Treatment Plant
Photo #9



Left Side of Spillway Bridge
Note depression
Photo #10



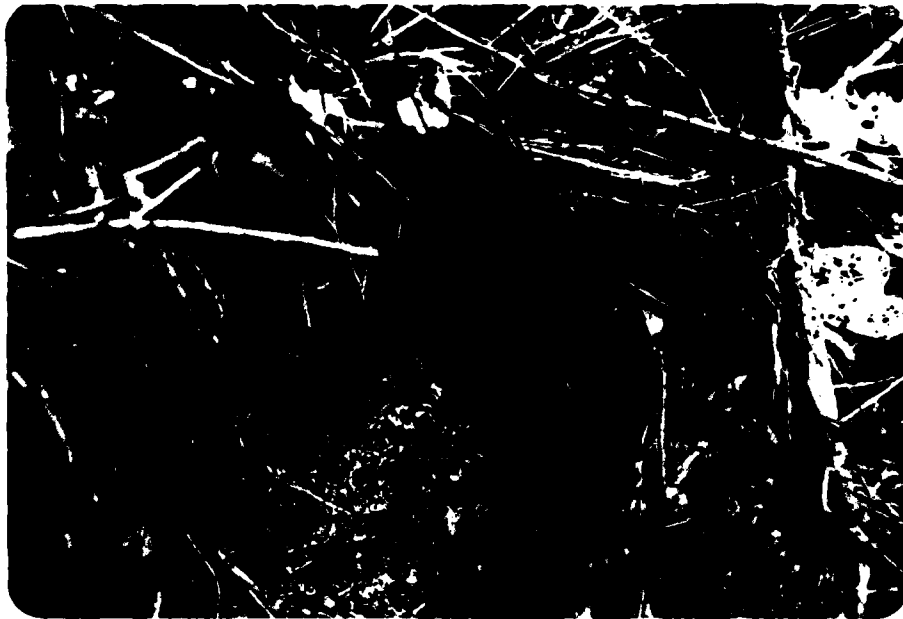
Right Side of Spillway Bridge
Note depression
Photo #11



Left Abutment of Spillway Bridge
Note Cracking
Photo #12



Joint in Left Spillway Wingwall (Upstream)
(immediately below Photo #12)
Photo #13



Seepage Near Toe of Right Embankment
Note: Soil was excavated to facilitate inspection
Photo #14

APPENDIX B

ENGINEERING DATA CHECKLIST

Check List
Engineering Data
Design Construction Operation

Name of Dam Cla. L. K.

I.D. # NY 751

Item	Remarks
Dam	Plans Yes
Spillway(s)	Details Yes
Outlet(s)	Typical Sections Yes
Design Reports	None
Design Computations	None
Discharge Rating Curves	None
Dam Stability	None
Seepage Studies	None
Subsurface and Materials Investigations	None

Item

Remarks

Construction History

Plans for Abutment 1 Dated Apr 20, 1925 construction assumed to be 1925 & probably 1926. Gunite repair on spillway & bridge 1966 Repair of cracked reservoir drain pipe (48" CIP) abt. 1965

Surveys, Modifications,
Post-Construction Engineering
Studies and Reports

None

Accidents or Failure of Dam
Description, Reports

Failure of section of gunite on spillway during Sept 19, 1979 storm (Friedrick); no structural damage to spillway only unsound gunite

Operation and Maintenance Records
Operation Manual

All records on file with Governor's Psychiatric Center

APPENDIX C
VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Clear Lake Dam
Fed. I.D. # NY 751 DEC Dam No. 12 D - 493
River Basin Lake Erie
Location: Town North Collins County Erie
Stream Name North Branch Clear Creek
Tributary of C. Haraugus Creek
Latitude (N) 42° 33.2' Longitude (W) 78° 51.1'
Type of Dam Earth embankment with concrete spillway
Hazard Category "C" High
Date(s) of Inspection 10/3 & 11/8 1979
Weather Conditions clear, Temp = 90's
Reservoir Level at Time of Inspection at Spilling crest / 1" over crest at 2nd inspection

b. Inspection Personnel K. Harmer, R. McCarty - NYS DEC

Designated By: Howard Segar, Robert Pura (Principal Stationary Eng), Wayne C. (S. V. H. (T. P. H. Operator))

c. Persons Contacted (Including Address & Phone No.)
Tom Armstrong (Bus Mgr.) Canada Pkg Ctr (716) 532-3311
Howard Segar (Plant Mgr.) (Home)
Paul Dwyer NYS Dept of Mental Hygiene 44 Holland Ave.
5th Fl. Albany NY (518) 479-3518

d. History:

Date Constructed 1935 Date(s) Reconstructed 1956 1966
1970

Designer N.Y.S. Office of General Services

Constructed By Unknown

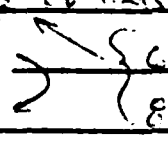
Owner NYS Department of Mental Hygiene, Canada Pkg Ctr.

2) Embankment

a. Characteristics

- (1) Embankment Material appears to be fine silt & clay
- (2) Cutoff Type concrete core wall in sd rock
- (3) Impervious Core concrete core wall 2' top width
x 4' bottom width founded on sand rock
- (4) Internal Drainage System none
- (5) Miscellaneous _____

b. Crest

- (1) Vertical Alignment good except for depression adjacent to spillway bridge abutments where settlement has occurred recently
- (2) Horizontal Alignment good 
- (3) Surface Cracks sewer cracking of pavement in the vicinity of the depressions near the spillway abutments
- (4) Miscellaneous abandoned highway traverses the crest of the dam and spillway. It is still used for maintenance of

c. Upstream Slope

- (1) Slope (Estimate) (V:H) drawings 1:2.5
very steep near crest then flattens out
- (2) Undesirable Growth or Debris, Animal Burrows none, but slope should be monitored
- (3) Sloughing, Subsidence or Depressions the area near the crest is very steep possibly from wave action cutting in an extension of the roadway shoulders

(4) Slope Protection appears to be some riprap at
water line

(5) Surface Cracks or Movement at Toe under water, unobservable

d. Downstream Slope

(1) Slope (Estimate - V:H) 1:2 see drawings

(2) Undesirable Growth or Debris, Animal Burrows 4 animal burrows
noted near midpoint of slope & right spillway abt., trees
growing on slopes also considerable brush.

(3) Sloughing, Subsidence or Depressions flow brush, rec. moving prog.
none evident

(4) Surface Cracks or Movement at Toe none evident

(5) Seepage ≈ 50' right of right spillway buttress near toe
flow rate ≈ 3 gpm 10/2/79, no flow 11/9/79. Flow was clear
assumed to be from previous rain and burrows above

(6) External Drainage System (Ditches, Trenches; Blanket) none

soft wet area w/vegetation at toe, recommend toe drain system

(7) Condition Around Outlet Structure not observable
piped to treatment plant, plant in excellent condition

(8) Seepage Beyond Toe none evident

e. Abutments - Embankment Contact

some tree growth on left embankment

(1) Erosion at Contact none noted

(2) Seepage Along Contact none noted

3) Drainage System

a. Description of System ORIGINAL PLAN SHOWS SHOWS
6" tile drain system, NOT CONFIRMED AFTER CONSTR.
AS PLANS WERE ALTERED.

b. Condition of System _____

c. Discharge from Drainage System _____

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs,
Piezometers, Etc.) _____

none

5) Reservoir

- a. Slopes appear stable
- b. Sedimentation no problems reported
- c. Unusual Conditions Which Affect Dam

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.)
trout plant, highway embankment, Callaway's Lake Reservoir
- b. Seepage, Unusual Growth none
- c. Evidence of Movement Beyond Toe of Dam none
- d. Condition of Downstream Channel bedrock between dam and
highway culvert

7) Spillway(s) (Including Discharge Conveyance Channel)

- a. General Mass concrete age crest w/ 3 pier highway
(abandoned) bridge over spillway, concrete chute
Spillway. Downstream face was originally stepped
in concrete, until 1966 when grout was placed on face
- b. Condition of Service Spillway During storm of Sept 14, 1979
a portion of grout was lifted off downstream face
"I"-bolts and mesh reinforcing were rusted and provided L.H.
support. Sounding of intact grout indicates bottom of
age section, piers and buttress walls are unsound
However the concrete of the original structure appears
sound where observed.

c. Condition of Auxiliary Spillway _____

N/A

d. Condition of Discharge Conveyance Channel Concrete slabs on

bedrock. Some slabs have shifted and cracked.

The left wall has shifted inward $\approx 1/2"$, vegetation is

growing in construction joints. Some erosion of concrete slabs

a crack running parallel to dam was noted in slab ≈ 5 feet

below end of energy dissipaters

Rusty empye beneath right spillway wall

8) Reservoir Drain/Outlet

Type: Pipe ☒ Conduit _____ Other _____

Material: Concrete _____ Metal ☒ Other _____

Size: 48" Length 280'

Invert Elevations: Entrance 1178.25 Exit _____

Physical Condition (Describe): _____ Unobservable ☒

Material: Cast Iron - See Plans

Joints: _____ Alignment _____

Structural Integrity: Problems were reported in the 48" pipe

and repairs were conducted in 1965. The drain has not been operated

for many years. The adjacent 24" pipe is
used when lowering of the reservoir is required.

Means of Control: Gate _____ Valve ☒ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other Unknown

Present Condition (Describe): 24" is operable 48"

has not been operated

9) Structural

- a. Concrete Surfaces constructed in 1960 (see drawings)
guide is loose and has spalled in some places
Storm of Sept 14, 1979 has eroded guide section
on left toe of spillway, erosion of concrete slab = 20' below dissip
left side = 4" deep
- b. Structural Cracking little evident guide covering
majority of structure, 1 crack parallel to dam
≈ 5 feet below toe of dissipaters in slab, some cracks in
highway bridge abutment (left) and bridge deck. (see photo)
- c. Movement - Horizontal & Vertical Alignment (Settlement) spillway appears unchanged assumed bedrock
foundation, left spillway wall has moved ≈ 1/2"
- d. Junctions with Abutments or Embankments appears adequate, except for left upstream
spillway wall where a 2 inch joint was noted (crawl up)
no apparent movement.
- e. Drains - Foundation, Joint, Face none in spillway several small face
drains to relieve pressure build-up behind guide
in walls of spillway outlet
- f. Water Passages, Conduits, Sluices reported operational for treatment plant
intake tower in reservoir appears to be
in good condition
- g. Seepage or Leakage approx 2 to 3 gpm emanating from
beneath right spillway at end of outlet channel
flow is generally clear, but rusty deposits were
present. Also some slight seepage w/ dark stains
no calcification on spillway outlet walls

- h. Joints - Construction, etc. require maintenance, some are
full of debris & grout. Joint between girder
and original concrete is opening up permitting
flow beneath, this should be sealed
- i. Foundation assumed to be bedrock, as evidenced
in outlet channel
- j. Abutments appear to be in good condition
- k. Control Gates reported operational
- l. Approach & Outlet Channels outlet channel is concrete slab
over bedrock and exposed bedrock, before entering
highway culvert. End section of concrete is
deteriorated & should be repaired as required
- m. Energy Dissipators (Plunge Pool, etc.) 3 rows of
dissipator blocks at toe of spillway, good
condition
- n. Intake Structures appears to be in good
condition, reported operational
- o. Stability no problems noted
- p. Miscellaneous

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

- a. Description and Condition Water treatment plant and
Appurtenances - Intake tower with 3-16" intakes
El 1210, 1198.4 and 1183.5 on side of tower. A 48"
Diam. Reservoir drain intake at El. 1179.25, 48" valve w/
all controls in tower. Tower located near toe of
upstream face of right embankment. 2 pipes through
embankment 24" & 48" CIP Ext. invert El 1177.75
A 12" CIP is tapped into the 24" CIP and
the 12" pipe feeds the treatment plant.

APPENDIX D
HYDROLOGIC/HYDRAULIC
ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

1

AREA-CAPACITY DATA:

	<u>Elevation</u> (ft.)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-ft.)
1) Top of Dam	<u>1222.0</u>	<u>97.0</u>	<u>1000.0</u>
2) Design High Water (Max. Design Pool)	<u>-</u>	<u>-</u>	<u>-</u>
3) Auxiliary Spillway Crest	<u>-</u>	<u>-</u>	<u>-</u>
4) Pool Level with Flashboards	<u>-</u>	<u>-</u>	<u>-</u>
5) Service Spillway Crest	<u>1216.0</u>	<u>46.0</u>	<u>650.0</u>

DISCHARGES

	<u>Volume</u> (cfs)
1) Average Daily	<u>VARIES</u>
2) Spillway @ Maximum High Water	<u>4100.0</u>
3) Spillway @ Design High Water	<u>-</u>
4) Spillway @ Auxiliary Spillway Crest Elevation	<u>-</u>
5) Low Level Outlet	<u>370</u>
6) Total (of all facilities) @ Maximum High Water	<u>4500</u>
7) Maximum Known Flood	<u>870</u>
8) At Time of Inspection	<u>0.</u>

CREST:

ELEVATION: 1216.0Type: UNGATED CONCRETE CGEEWidth: _____ Length: 100'

Spillover: _____

Location: LEFT SIDE THROUGH EMBANKMENT.

SPILLWAY:

SERVICE

AUXILIARY

1216.0

Elevation

Concrete CGEE

Type

100'

Width

Type of Controlyes

Uncontrolled

Controlled:

Type

(Flashboards; gate)

Number

Size/Length

Invert Material

Anticipated Length
of operating service60'

Chute Length

12'Height Between Spillway Crest
& Approach Channel Invert
(Weir Flow)

HYDROMETEROLOGICAL GAGES:

Type : NONE

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

Method of Controlled Releases (mechanisms):

MANUAL VALVES (48" DRAIN)

DRAINAGE AREA: 5.25 mi. ²

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Rural, some agricultural use some wooded

Terrain - Relief: mild slopes many trails to lake & creek

Surface - Soil: glacial till well drained

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

no alterations planned,

Potential Sedimentation problem areas (natural or man-made; present or future)

None

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

None.

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: —

Elevation: —

Reservoir:

Length @ Maximum Pool 1 mile (Miles)

Length of Shoreline (@ Spillway Crest) 2.25 (Miles)

PLEASE REPORT ANY UNUSUAL OPERATING PROBLEMS
TO MIKE YILLSON (RM, 423) PH: 7-5666

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2-11-3-1

0 K O I Z

9 K1 INFLOW TO CLEAR LAKE RES.

Item	Unit	Price	Quantity	Total
1.00	1	5.95	1	5.95
1.00	1	5.95	1	5.95

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Population (millions)	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0									
GDP (trillions of dollars)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0						
Life expectancy (years)	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110

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PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS
RUNOFF HYDROGRAPH AT 1
ROUTE HYDROGRAPH TO 1
END OF NETWORK

 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 26 FEB 79
 MODIFIED FOR MONEYWELL APR 79

 THIS PROGRAM IS CURRENTLY BEING MODIFIED
 TO RUN ON THE DCS MONEYWELL SYSTEM

PLEASE REPORT ANY UNUSUAL OPERATING PROBLEMS
 TO MIKE TILLSIN (RM, 423) PH 7-5666

RUN DATE 01/14/80

CLEAR LAKE
 PHASE 1
 PHF

JOB SPECIFICATION
 NO NHR NMIN IDAY IMH IMIN METRC IPLT IPRT NSTAN
 200 0 30 0 0 0 0 0 0
 JOPER 5 NMT LROPT TRACE
 5 0 0 0

MULTI-PLAN ANALYSES TO BE PERFORMED
 NPLAN= 1 NRTIO= 2 LRTIO= 1
 RTIOS= 0.50 1.00

SUB-AREA RUNOFF COMPUTATION

INFLOW TO CLEAR LAKE RES.

ISTAQ ICDP IFCN ITAPE JPLT JPRT INAME ISTATE IAUTO
 1 0 0 0 2 0 1 0 0

HYDROGRAPH DATA

IMYDG IUNG TAREA SNAP TRSDA TRSPC RATIO ISNOW ISAME LOCAL
 1 1 5.95 5.95 5.95 0. 0. 0. 0. 0. 0.

PRECIP DATA

SPE PHS R6 R12 R24 R48 R72 R96
 0. 22.50 117.00 128.00 136.00 148.00 0. 0.

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT STRKR DLTKR RTIOL ERAIN STRKS RTIOK STRTL CNSTL ALSHX RTIMP
 0 0. 0. 1.00 0. 0. 1.00 1.00 0.10 0. 0.

UNIT HYDROGRAPH DATA

TP= 4.90 CP=0.63 NTAM 0

RECESSION DATA

STRQ= -2.00 QRCNS= -0.05 RTIDR= 1.00
 APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC=10.90 AND R= 9.11 INTERVALS

UNIT HYDROGRAPH 55 EMD=DF=PERIOD ORDINATES, LAG= 4.89 HOURS, CP= 0.63 VOL= 1.00
 16. 58. 118. 187. 261. 338. 406. 456. 488. 502.
 491. 453. 364. 292. 234. 210. 188.

MO.	DA	HR.	MN	PERIOD	RAIN	EXCS	LOSS	40.	36.	32.	29.	26.	23.	21.
19.	17.	15.	13.	11.	9.	7.	5.	3.	1.	0.	0.	0.	0.	0.
6.	6.	5.	4.	3.	2.	1.	0.	0.	0.	0.	0.	0.	0.	0.
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.01	1.01	0.30	0.00	1	0.00	0.00	0.00	12.	12.	1.03	2.30	0.00	0.00	3057.
1.01	1.01	0.30	0.00	2	0.00	0.00	0.00	12.	12.	1.03	3.00	0.00	0.00	2749.
1.01	1.01	1.30	0.00	3	0.00	0.00	0.00	12.	12.	1.03	3.30	0.00	0.00	2470.
1.01	1.01	2.00	0.00	4	0.00	0.00	0.00	12.	12.	1.03	4.00	0.00	0.00	2219.
1.01	1.01	2.30	0.00	5	0.00	0.00	0.00	12.	12.	1.03	4.30	0.00	0.00	1992.
1.01	1.01	3.00	0.00	6	0.00	0.00	0.00	12.	12.	1.03	5.00	0.00	0.00	1787.
1.01	1.01	3.30	0.00	7	0.00	0.00	0.00	12.	12.	1.03	5.30	0.00	0.00	1603.
1.01	1.01	4.00	0.00	8	0.00	0.00	0.00	12.	12.	1.03	6.00	0.00	0.00	1437.
1.01	1.01	4.30	0.00	9	0.00	0.00	0.00	12.	12.	1.03	6.30	0.00	0.00	1289.
1.01	1.01	5.00	0.00	10	0.00	0.00	0.00	12.	12.	1.03	7.00	0.00	0.00	1156.
1.01	1.01	5.30	0.00	11	0.00	0.00	0.00	12.	12.	1.03	7.30	0.00	0.00	1037.
1.01	1.01	6.00	0.00	12	0.00	0.00	0.00	12.	12.	1.03	8.00	0.00	0.00	931.
1.01	1.01	6.30	0.01	13	0.01	0.01	0.01	12.	12.	1.03	8.30	0.00	0.00	835.
1.01	1.01	7.00	0.01	14	0.01	0.01	0.01	12.	12.	1.03	9.00	0.00	0.00	749.
1.01	1.01	7.30	0.01	15	0.01	0.01	0.01	12.	12.	1.03	9.30	0.00	0.00	673.
1.01	1.01	8.00	0.01	16	0.01	0.01	0.01	12.	12.	1.03	10.00	0.00	0.00	604.
1.01	1.01	8.30	0.01	17	0.01	0.01	0.01	12.	12.	1.03	10.30	0.00	0.00	542.
1.01	1.01	9.00	0.01	18	0.01	0.01	0.01	12.	12.	1.03	11.00	0.00	0.00	486.
1.01	1.01	9.30	0.01	19	0.01	0.01	0.01	12.	12.	1.03	11.30	0.00	0.00	452.
1.01	1.01	10.00	0.01	20	0.01	0.01	0.01	12.	12.	1.03	12.00	0.00	0.00	452.
1.01	1.01	10.30	0.01	21	0.01	0.01	0.01	12.	12.	1.03	12.30	0.00	0.00	452.
1.01	1.01	11.00	0.01	22	0.01	0.01	0.01	12.	12.	1.03	13.00	0.00	0.00	452.
1.01	1.01	11.30	0.01	23	0.01	0.01	0.01	12.	12.	1.03	13.30	0.00	0.00	452.
1.01	1.01	12.00	0.01	24	0.01	0.01	0.01	12.	12.	1.03	14.00	0.00	0.00	452.
1.01	1.01	12.30	0.01	25	0.01	0.01	0.01	12.	12.	1.03	14.30	0.00	0.00	452.
1.01	1.01	13.00	0.01	26	0.01	0.01	0.01	12.	12.	1.03	15.00	0.00	0.00	452.
1.01	1.01	13.30	0.01	27	0.01	0.01	0.01	12.	12.	1.03	15.30	0.00	0.00	452.
1.01	1.01	14.00	0.01	28	0.01	0.01	0.01	12.	12.	1.03	16.00	0.00	0.00	452.
1.01	1.01	14.30	0.01	29	0.01	0.01	0.01	12.	12.	1.03	16.30	0.00	0.00	452.
1.01	1.01	15.00	0.01	30	0.01	0.01	0.01	12.	12.	1.03	17.00	0.00	0.00	452.
1.01	1.01	15.30	0.01	31	0.01	0.01	0.01	12.	12.	1.03	17.30	0.00	0.00	452.
1.01	1.01	16.00	0.01	32	0.01	0.01	0.01	12.	12.	1.03	18.00	0.00	0.00	452.
1.01	1.01	16.30	0.01	33	0.01	0.01	0.01	12.	12.	1.03	18.30	0.00	0.00	452.
1.01	1.01	17.00	0.01	34	0.01	0.01	0.01	12.	12.	1.03	19.00	0.00	0.00	452.
1.01	1.01	17.30	0.01	35	0.01	0.01	0.01	12.	12.	1.03	19.30	0.00	0.00	452.
1.01	1.01	18.00	0.01	36	0.01	0.01	0.01	12.	12.	1.03	20.00	0.00	0.00	452.
1.01	1.01	18.30	0.01	37	0.01	0.01	0.01	12.	12.	1.03	20.30	0.00	0.00	452.
1.01	1.01	19.00	0.01	38	0.01	0.01	0.01	12.	12.	1.03	21.00	0.00	0.00	452.
1.01	1.01	19.30	0.01	39	0.01	0.01	0.01	12.	12.	1.03	21.30	0.00	0.00	452.
1.01	1.01	20.00	0.01	40	0.01	0.01	0.01	12.	12.	1.03	22.00	0.00	0.00	452.
1.01	1.01	20.30	0.01	41	0.01	0.01	0.01	12.	12.	1.03	22.30	0.00	0.00	452.
1.01	1.01	21.00	0.01	42	0.01	0.01	0.01	12.	12.	1.03	23.00	0.00	0.00	452.
1.01	1.01	21.30	0.01	43	0.01	0.01	0.01	12.	12.	1.03	23.30	0.00	0.00	452.
1.01	1.01	22.00	0.01	44	0.01	0.01	0.01	12.	12.	1.04	0.	0.00	0.00	452.
1.01	1.01	22.30	0.01	45	0.01	0.01	0.01	12.	12.	1.04	0.30	0.00	0.00	452.
1.01	1.01	23.00	0.01	46	0.01	0.01	0.01	12.	12.	1.04	1.00	0.00	0.00	452.
1.01	1.01	23.30	0.01	47	0.01	0.01	0.01	12.	12.	1.04	1.30	0.00	0.00	452.
1.02	0.	0.	0.	48	0.01	0.01	0.01	12.	12.	1.04	2.00	0.00	0.00	452.
1.02	0.30	0.00	0.05	49	0.05	0.05	0.05	12.	12.	1.04	2.30	0.00	0.00	452.
1.02	1.00	0.00	0.05	50	0.05	0.05	0.05	12.	12.	1.04	3.00	0.00	0.00	452.
1.02	1.30	0.00	0.05	51	0.05	0.05	0.05	12.	12.	1.04	3.30	0.00	0.00	452.
1.02	2.00	0.00	0.05	52	0.05	0.05	0.05	12.	12.	1.04	4.00	0.00	0.00	452.
1.02	2.30	0.00	0.05	53	0.05	0.05	0.05	12.	12.	1.04	4.30	0.00	0.00	452.
1.02	3.00	0.00	0.05	54	0.05	0.05	0.05	12.	12.	1.04	5.00	0.00	0.00	452.
1.02	3.30	0.00	0.05	55	0.05	0.05	0.05	12.	12.	1.04	5.30	0.00	0.00	452.
1.02	4.00	0.00	0.05	56	0.05	0.05	0.05	12.	12.	1.04	6.00	0.00	0.00	452.
1.02	4.30	0.00	0.05	57	0.05	0.05	0.05	12.	12.	1.04	6.30	0.00	0.00	452.
1.02	5.00	0.00	0.05	58	0.05	0.05	0.05	12.	12.	1.04	7.00	0.00	0.00	452.
1.02	5.30	0.00	0.05	59	0.05	0.05	0.05	12.	12.	1.04	7.30	0.00	0.00	452.

1.02	6.30	0.	0.16	0.12	0.05	69.	1.04	8.30	161	0.	0.	0.	452.
1.02	7.00	62	0.16	0.12	0.05	70.	1.04	9.00	162	0.	0.	0.	452.
1.02	7.30	63	0.16	0.12	0.05	78.	1.04	9.30	163	0.	0.	0.	452.
1.02	8.00	64	0.16	0.12	0.05	95.	1.04	10.00	164	0.	0.	0.	452.
1.02	8.30	65	0.16	0.12	0.05	121.	1.04	10.30	165	0.	0.	0.	452.
1.02	9.00	66	0.16	0.12	0.05	156.	1.04	11.00	166	0.	0.	0.	452.
1.02	9.30	67	0.16	0.12	0.05	200.	1.04	11.30	167	0.	0.	0.	452.
1.02	10.00	68	0.16	0.12	0.05	249.	1.04	12.00	168	0.	0.	0.	452.
1.02	10.30	69	0.16	0.12	0.05	303.	1.04	12.30	169	0.	0.	0.	452.
1.02	11.00	70	0.16	0.12	0.05	358.	1.04	13.00	170	0.	0.	0.	452.
1.02	11.30	71	0.16	0.12	0.05	412.	1.04	13.30	171	0.	0.	0.	452.
1.02	12.00	72	0.16	0.12	0.05	462.	1.04	14.00	172	0.	0.	0.	452.
1.02	12.30	73	1.05	1.00	0.05	521.	1.04	14.30	173	0.	0.	0.	452.
1.02	13.00	74	1.05	1.00	0.05	613.	1.04	15.00	174	0.	0.	0.	452.
1.02	13.30	75	1.26	1.21	0.05	758.	1.04	15.30	175	0.	0.	0.	452.
1.02	14.00	76	1.26	1.21	0.05	968.	1.04	16.00	176	0.	0.	0.	452.
1.02	14.30	77	1.58	1.53	0.05	1259.	1.04	16.30	177	0.	0.	0.	452.
1.02	15.00	78	1.58	1.53	0.05	1643.	1.04	17.00	178	0.	0.	0.	452.
1.02	15.30	79	1.92	1.87	0.05	2124.	1.04	17.30	179	0.	0.	0.	452.
1.02	16.00	80	6.08	6.03	0.05	2766.	1.04	18.00	180	0.	0.	0.	452.
1.02	16.30	81	1.47	1.42	0.05	3597.	1.04	18.30	181	0.	0.	0.	452.
1.02	17.00	82	1.47	1.42	0.05	4548.	1.04	19.00	182	0.	0.	0.	452.
1.02	17.30	83	1.16	1.11	0.05	5548.	1.04	19.30	183	0.	0.	0.	452.
1.02	18.00	84	1.16	1.11	0.05	6536.	1.04	20.00	184	0.	0.	0.	452.
1.02	18.30	85	0.07	0.02	0.05	7451.	1.04	20.30	185	0.	0.	0.	452.
1.02	19.00	86	0.07	0.02	0.05	8203.	1.04	21.00	186	0.	0.	0.	452.
1.02	19.30	87	0.07	0.02	0.05	8726.	1.04	21.30	187	0.	0.	0.	452.
1.02	20.00	88	0.07	0.02	0.05	9005.	1.04	22.00	188	0.	0.	0.	452.
1.02	20.30	89	0.07	0.02	0.05	9034.	1.04	22.30	189	0.	0.	0.	452.
1.02	21.00	90	0.07	0.02	0.05	8799.	1.04	23.00	190	0.	0.	0.	452.
1.02	21.30	91	0.07	0.02	0.05	8318.	1.04	23.30	191	0.	0.	0.	452.
1.02	22.00	92	0.07	0.02	0.05	7704.	1.05	0.	192	0.	0.	0.	452.
1.02	22.30	93	0.07	0.02	0.05	7055.	1.05	0.30	193	0.	0.	0.	452.
1.02	23.00	94	0.07	0.02	0.05	6399.	1.05	1.00	194	0.	0.	0.	452.
1.02	23.30	95	0.07	0.02	0.05	5767.	1.05	1.30	195	0.	0.	0.	452.
1.03	0.	96	0.07	0.02	0.05	5106.	1.05	2.00	196	0.	0.	0.	452.
1.03	0.30	97	0.	0.	0.	4665.	1.05	2.30	197	0.	0.	0.	452.
1.03	1.00	98	0.	0.	0.	4197.	1.05	3.00	198	0.	0.	0.	452.
1.03	1.30	99	0.	0.	0.	3777.	1.05	3.30	199	0.	0.	0.	452.
1.03	2.00	100	0.	0.	0.	3398.	1.05	4.00	200	0.	0.	0.	452.

SUM 26.64 22.91 3.73 210215.
(677.)(582.)(95.)(5952.63)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	9034.	7741.	3439.	1416.	20960.
CMS	256.	219.	97.	40.	5945.
INCHES		12.10	21.51	26.57	27.35
MM		307.39	546.32	674.97	694.81
AC=FT		3838.	6822.	8428.	8676.
THOUS CU M		4735.	8415.	10396.	10702.

STATION 1

[illegible]

5.30	591
6.00	601
6.30	611
7.00	621
7.30	631
8.00	641
8.30	651
9.00	661
9.30	671
10.00	681
10.30	691
11.00	701
11.30	711
12.00	721
12.30	731
13.00	741
13.30	751
14.00	761
14.30	771
15.00	781
15.30	791
16.00	801
16.30	811
17.00	821
17.30	831
18.00	841
18.30	851
19.00	861
19.30	871
20.00	881
20.30	891
21.00	901
21.30	911
22.00	921
22.30	931
23.00	941
23.30	951
0.	961
0.30	971
1.00	981
1.30	991
2.00	1001
2.30	1011
3.00	1021
3.30	1031
4.00	1041
4.30	1051
5.00	1061
5.30	1071
6.00	1081
6.30	1091
7.00	1101
7.30	1111
8.00	1121
8.30	1131
9.00	1141
9.30	1151
10.00	1161
10.30	1171
11.00	1181
11.30	1191
12.00	1201
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	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL	VOLUME
CFS	4517.	3870.	1720.	708.		104980.
CMS	128.	110.	49.	20.		2973.
INCHES		6.05	10.75	13.29		13.68
		153.69	273.16	337.49		347.40
AC-FT		1919.	3411.	4214.		4338.
THOUS CU YD		2367.	4207.	5198.		5351.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL	VOLUME
CFS	9034.	7741.	3439.	1416.	209960.	
CMS	256.	219.	97.	40.	5945.	
INCHES		12.10	21.51	26.57	27.35	
MM		307.39	546.32	674.97	694.81	
AC-FT		3838.	6822.	8428.	8676.	
THOUS CU M		4735.	8415.	10396.	10702.	

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

[illegible]

6.30 6110
7.00 621
7.30 631
8.00 641
8.30 6501
9.00 661
9.30 671
10.00 681
10.30 69.01
11.00 70.01
11.30 71.01
12.00 72.01
12.30 73.01
13.00 74.01
13.30 75.01
14.00 76.01
14.30 77.01
15.00 78.01
15.30 79.01
16.00 80.01
16.30 81.01
17.00 82.01
17.30 83.01
18.00 84.01
18.30 85.01
19.00 86.01
19.30 87.01
20.00 88.01
20.30 89.01
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2. 30197.
3. 00198.
3. 30199.
4. 00200.

4.00200.1.

[illegible][illegible]

STAGE						
1216.0	1216.0	1216.0	1216.0	1216.0	1216.0	1216.0
1216.0	1216.0	1216.0	1216.0	1216.0	1216.0	1216.0
1216.0	1216.0	1216.0	1216.0	1216.0	1216.0	1216.0
1216.9	1217.0	1216.1	1216.2	1216.3	1216.5	1216.7
1216.9	1217.0	1217.1	1217.0	1217.0	1217.0	1216.9
1216.8	1216.7	1216.6	1216.6	1216.5	1216.4	1216.4
1216.3	1216.3	1216.3	1216.3	1216.4	1216.5	1216.7
1217.0	1217.1	1217.2	1217.4	1217.6	1218.3	1216.7
1220.1	1220.1	1222.4	1223.0	1223.4	1223.7	1219.4
1223.6	1223.3	1223.1	1223.9	1222.7	1222.5	1221.7
1221.4	1220.6	1220.3	1220.0	1219.6	1219.3	1218.9
1218.5	1218.1	1218.0	1217.8	1217.7	1217.5	1217.3
1217.3	1217.2	1217.2	1217.2	1217.2	1217.2	1217.2

PEAK OUTFLOW IS 9023. AT TIME 44.50 HOURS

TOTAL VOLUME
208524.
5905.
27.17
690.05
8617.
10629.

	0.	2000.	4000.	6000.	8000.	10000.	
0.30	11	.	.	.	.	.	0.
1.00	21	.	.	.	.	.	0.
1.30	31	.	.	.	.	.	0.
2.00	41	.	.	.	.	.	0.
2.30	51	.	.	.	.	.	0.
3.00	61	.	.	.	.	.	0.
3.30	71	.	.	.	.	.	0.
4.00	81	.	.	.	.	.	0.
4.30	91	.	.	.	.	.	0.
5.00	101	.	.	.	.	.	0.
5.30	111	.	.	.	.	.	0.
6.00	121	.	.	.	.	.	0.
6.30	131	.	.	.	.	.	0.
7.00	141	.	.	.	.	.	0.
7.30	151	.	.	.	.	.	0.
8.00	161	.	.	.	.	.	0.
8.30	171	.	.	.	.	.	0.
9.00	181	.	.	.	.	.	0.
9.30	191	.	.	.	.	.	0.
10.00	201	.	.	.	.	.	0.
10.30	211	.	.	.	.	.	0.
11.00	221	.	.	.	.	.	0.
11.30	231	.	.	.	.	.	0.
12.00	241	.	.	.	.	.	0.
12.30	251	.	.	.	.	.	0.
13.00	261	.	.	.	.	.	0.
13.30	271	.	.	.	.	.	0.
14.00	281	.	.	.	.	.	0.
14.30	291	.	.	.	.	.	0.
15.00	301	.	.	.	.	.	0.
15.30	311	.	.	.	.	.	0.
16.00	321	.	.	.	.	.	0.
16.30	331	.	.	.	.	.	0.
17.00	341	.	.	.	.	.	0.
17.30	3501	.	.	.	.	.	0.
18.00	3601	.	.	.	.	.	0.
18.30	37.1	.	.	.	.	.	0.
19.00	38.1	.	.	.	.	.	0.
19.30	39.01	.	.	.	.	.	0.
20.00	40.01	.	.	.	.	.	0.
20.30	41.01	.	.	.	.	.	0.
21.00	42.01	.	.	.	.	.	0.
21.30	43.1	.	.	.	.	.	0.
22.00	44.1	.	.	.	.	.	0.
22.30	45.1	.	.	.	.	.	0.
23.00	46.10	.	.	.	.	.	0.
23.30	47.10	.	.	.	.	.	0.
0.	43.1	.	.	.	.	.	0.
0.30	49.1	.	.	.	.	.	0.
1.00	50.1	.	.	.	.	.	0.
1.30	51.1	.	.	.	.	.	0.
2.00	52.1	.	.	.	.	.	0.
2.30	53.1	.	.	.	.	.	0.
3.00	54.1	0.
3.30	55.1	0.
4.00	56.1	0.
4.30	5710	0.
5.00	5810	0.
5.30	5910	0.

6.30 0110
7.00 621
7.30 631
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9.00 661
9.30 671
10.00 681
10.30 69.01
11.00 70.01
11.30 71.01
12.00 72.01
12.30 73. 01
13.00 74. 01
13.30 75. 01
14.00 76. 01
14.30 77. 01
15.00 78. 01
15.30 79. 01
16.00 80. 01
16.30 81. 01
17.00 82. 01
17.30 83. 01
18.00 84. 01
18.30 85. 01
19.00 86. 01
19.30 87. 01
20.00 88. 01
20.30 89. 01
21.00 90. 01
21.30 91. 01
22.00 92. 01
22.30 93. 01
23.00 94. 01
23.30 95. 01
0. 96. 01
0.30 97. 01
1.00 98. 01
1.30 99. 01
2.00100. 01
2.30101. 01
3.00102. 01
3.30103. 01
4.00104. 01
4.30105. 01
5.00106. 01
5.30107. 01
6.00108. 01
6.30109. 01
7.00110. 01
7.30111. 01
8.00112. 01
8.30113. 01
9.00114. 01
9.30115. 01
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[illegible]

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2
				0.50	1.00
HYDROGRAPH AT	1	5.95	1	4517,	9034,
	(	0.00)	(	127.91)(	255.82)(
ROUTED TO	1	5.95	1	4254,	9023,
	(	0.00)	(	120.46)(	255.49)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

ELEVATION		INITIAL VALUE		SPILLWAY CREST		TOP OF DAM	
STORAGE		1216.00		1216.00		1222.00	
OUTFLOW		694.		694.		1047.	
		0.		0.		4250.	
RATIO		MAXIMUM		MAXIMUM		DURATION	
OF		STORAGE		OUTFLOW		OVER TOP	
PMF		AC-FT		CFS		HOURS	
0.50		1047.		4254.		0.50	
1.00		1180.		9023.		8.00	
						TIME OF	
						MAX OUTFLOW	
						HOURS	
						45.50	
						44.50	
						TIME OF	
						FAILURE	
						HOURS	
						0.	
						0.	

APPENDIX E

REFERENCES

APPENDIX E

REFERENCES

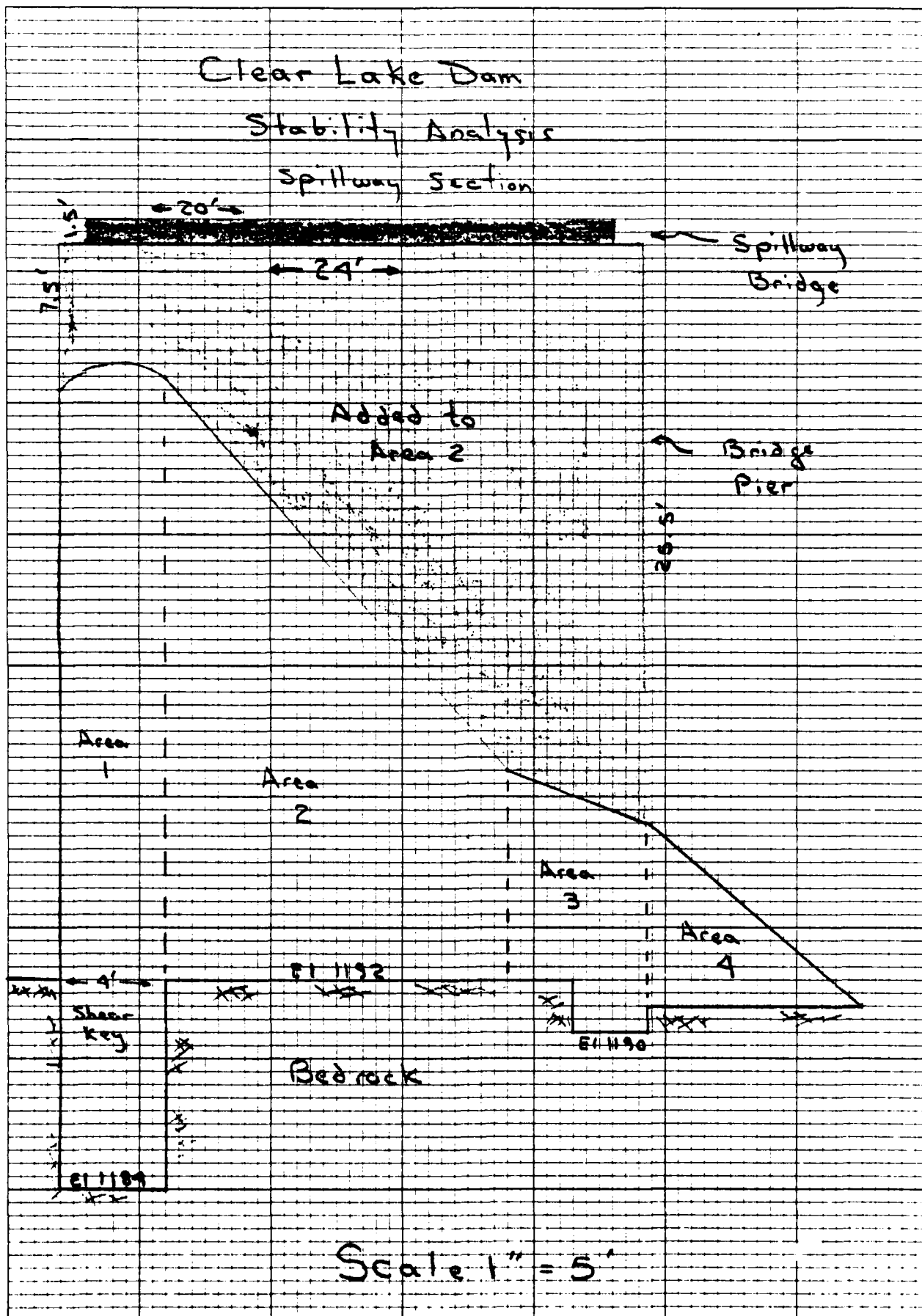
- 1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.
- 2) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972 (U.S. Department of Agriculture).
- 3) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.
- 4) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.
- 5) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.
- 6) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.
- 7) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX F

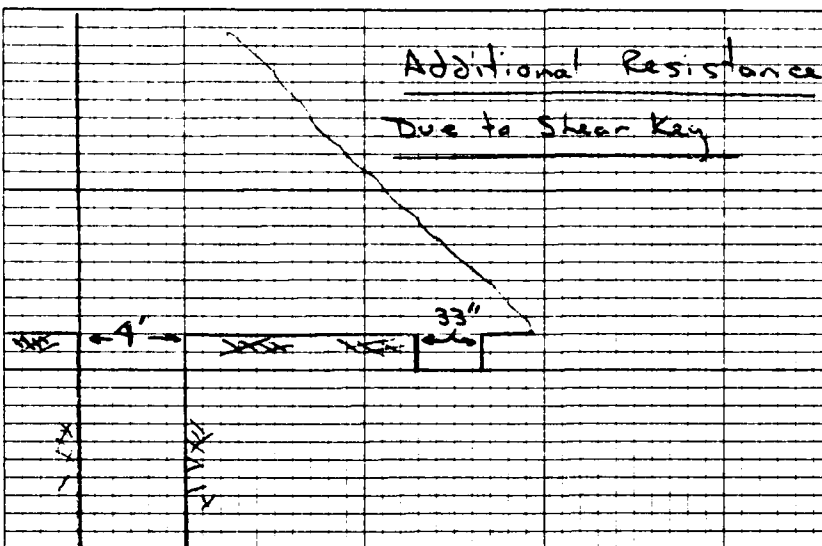
STABILITY ANALYSES

46 0700

K.E. 10 X 10 TO THE INCH = 7 X 10 INCHES
NEUFFEL & LESSER CO. MADE IN U.S.A.



	Area	Moment Arm
Area 1	$31.5 \times 4 = 126 \text{ ft}^2$	29
Area 2	$13 \times \left(\frac{23+9}{2}\right) = 201.5$ 254.4	21.55
<u>Bridge & Piers Adjustment</u>		
16.5		
3 piers \times 3' wide \times height $\left(\frac{7.5 \times 28.5}{2}\right) \times 24 \text{ long}$		
$= 100' \text{ (length of spillway)} = 35.64 \text{ sf/L.F.}$		
\times Moment Arm 16' = 570.24 'sf./L.F.		
Bridge 20 feet wide \times 1.5 feet thick = 30 sf/L.F.		
\times moment Arm 19' = 570 'sf./L.F.		
Total = 1140.24 'sf./L.F.		
$1140 \div \text{Area 2 Moment Arm (21.55)} = 52.90 \text{ sf.}$		
$201.5 + 52.9 = 254.4 \text{ ft}^2$		
<hr/>		
Area 3	$6 \times \left(\frac{6+8}{2}\right) = 42$	11.15
Area 4	$\frac{1}{2} (8 \times 7) = 28$	$2\left(\frac{8}{3}\right) = 5.33$
<u>Seismic Zone 3 $\alpha = .10$</u>		



Shear Strength of Concrete

$2\sqrt{2000}$ psi compressive strength (f'_c)

= 89.5 psi shear strength

Analysis is for a 1 foot thick section
therefore surface of shear keys are

$$48" \times 12" = 576 \text{ in}^2 \text{ at heel}$$

$$33" \times 12" = 396 \text{ in}^2 \text{ at toe}$$

$$\begin{aligned} 89.5 \text{ psi} \times 576 \text{ in}^2 &= 51,519 \text{ plf} \\ + 89.5 \text{ psi} \times 396 \text{ in}^2 &= 35,419 \text{ plf} \\ \hline &86,938 \text{ plf} \end{aligned}$$

Total Shear Resistance of 16 Keys = 86.9 Kips

Sto 58

INPUT FOR STABILITY ANALYSIS PROGRAM

<u>Input Location</u>	<u>Input Parameter Description</u>
0	Unit Weight of Dam. (K/ft. ³)
1	Area of Segment #1 (ft. ²)
2	Location of Center of Gravity from toe (ft.) Segment #1
3	Area of Segment #2 (ft. ²)
4	Location of CG from toe, Seg. #2 (ft.)
5	Area of Segment #3 (ft. ²)
6	Location of CG from toe, Sg. #3 (ft.)
7	Total Base Width of Dam (ft.)
8	Height of Dam (ft.)
9	Ice Loading (K/L.F.)
10	Coefficient of Sliding
11	Unit Weight of Soil (K/ft. ³)
12	Coefficient of Active Soil Pressure - Ka
13	Coefficient of Passive Soil Pressure - Kp
14	Height of Water over Top of Dam (ft.)
15	Height of Soil for Active Pressure (ft.)
16	Height of Soil for Passive Pressure (ft.)
17	Height of Water in Tailrace Channel (ft.)
18	Unit Weight of Water (K/ft. ³)
19	Area of Segment #4 (ft. ²)
20	Location of CG from toe, Seg. #4 (ft.)
46	Height of Ice Load or Active Water
49	Location of Foundation Drains from Heel (ft.)
50	Seismic Coefficient (α)
58	Resistance from Benefit of Shear Key (Kips)

Stability Analysis Input Parameters

	Case I	Case II	Case III	Case IV	Case V
00 = .15					
01 = 126					
02 = 29					
03 = 254.4					
04 = 21.55					
05 = 42					
06 = 11.15					
07 = 31					
08 = 23.5					
09 = 0		7.5	0	0	0
10 = 0.6					
11 = .15					
12 = 0					
13 = 566					
14 = 0		0	6	8	0
15 = 0					
16 = 8					
17 = 0		0	6	8	0
18 = 0.0624					
19 = 28					
20 = 5.33					
46 = 23.5					
50 = 0		0	0	0	0.1
58 = 86.9					

460700

K&E
10 X 10 TO THE INCH = 7 X 10 IN. IN 1/2
KEUFFEL & ESSER CO. MADE IN U.S.A.

CLEAR LAKE DAM
STABILITY ANALYSIS
SPILLWAY SECTION

Case I Normal Loading

(a) 2.539292189

(b) 20.7629643

(c) 8.131360634

Case IV PMF

(a) 1.873368077

(b) 19.36603744

(c) 4.77603707

Case II Ice Loading

(a) 1.966212723

(b) 16.33151539

(c) 5.700175494

Case V Seismic Loading

(a) 1.99684651

(b) 17.09875847

(c) 5.443354892

Case III 1/2 PMF

(a) 2.002167555

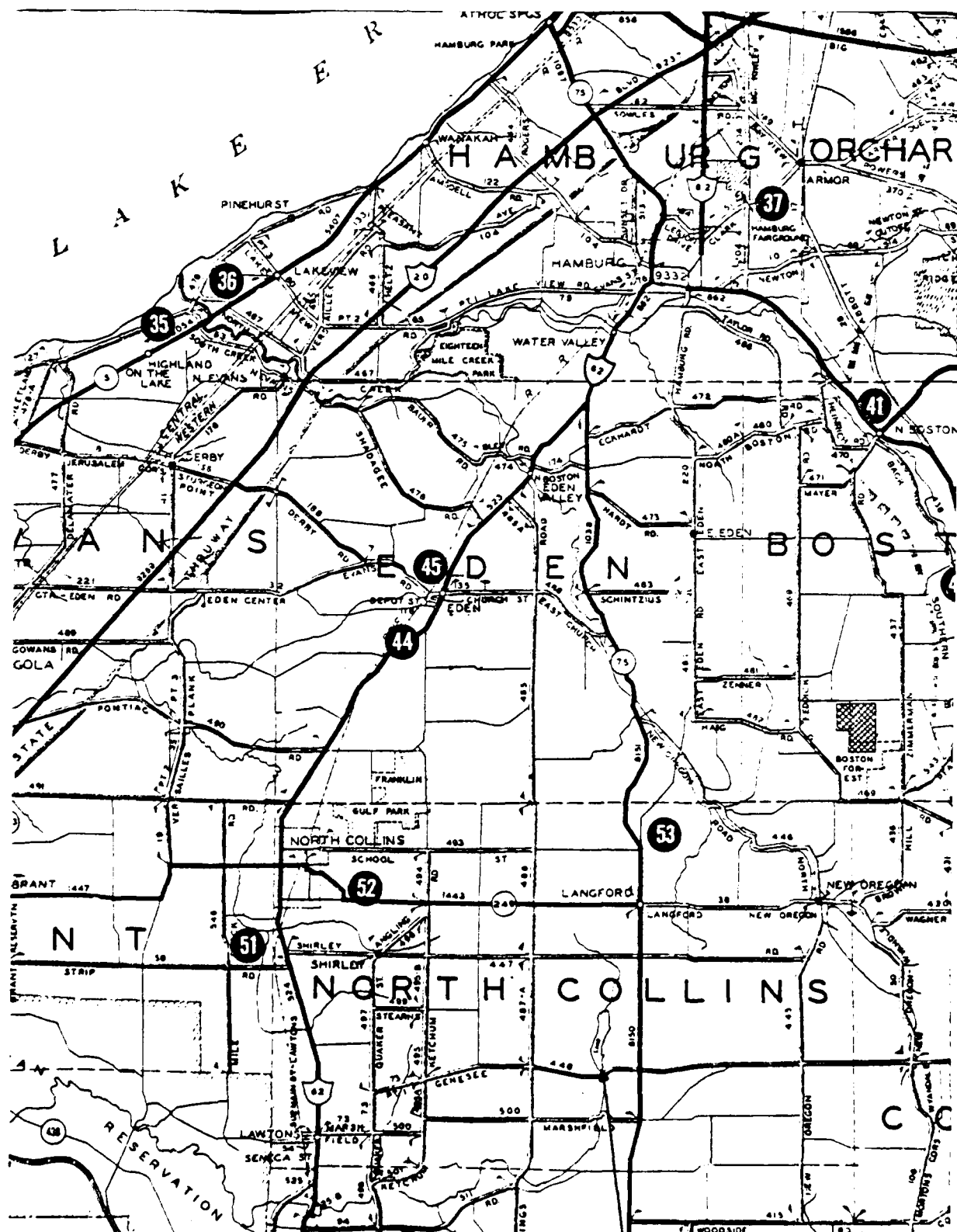
(b) 19.72242977

(c) 5.325209961

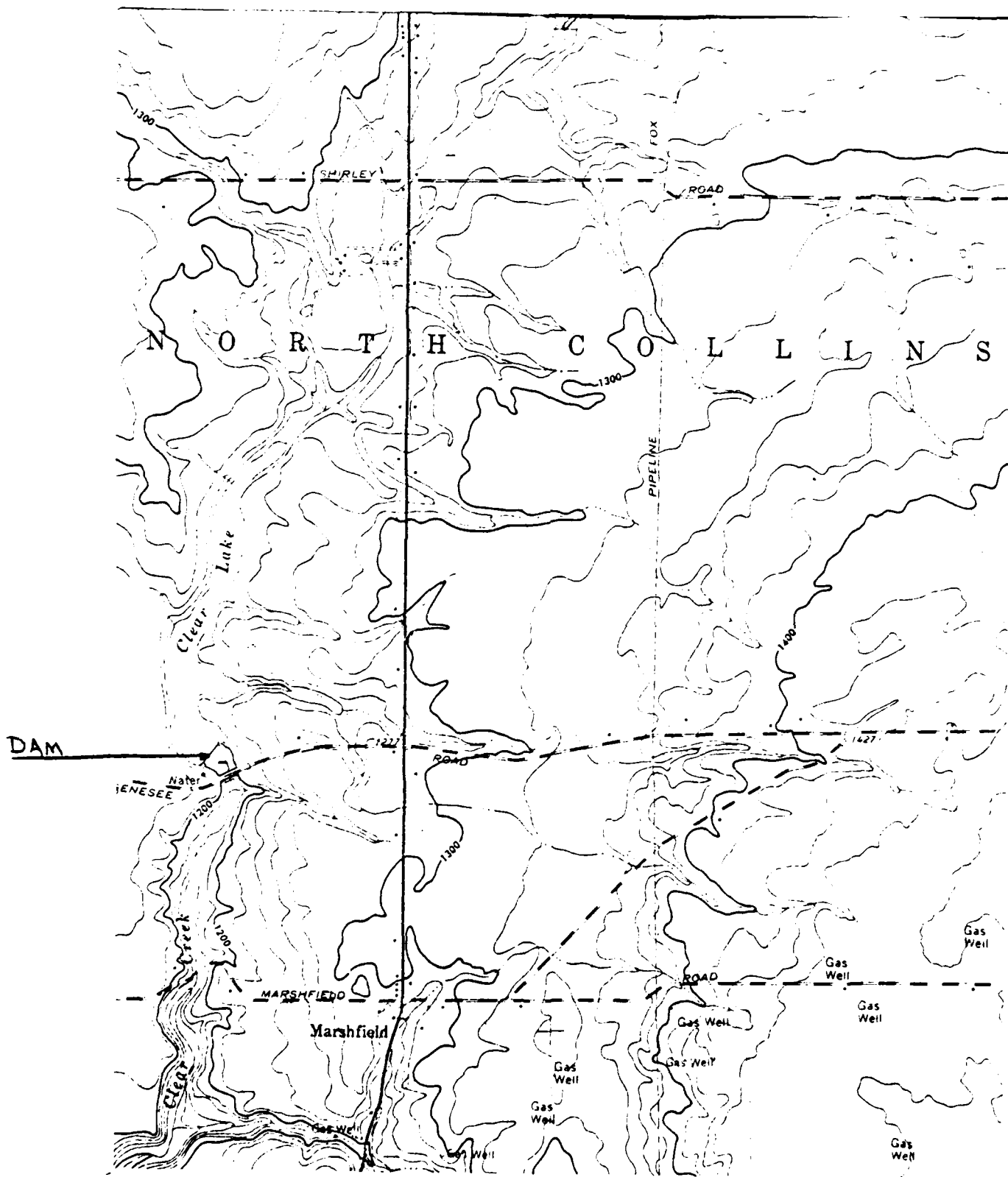
NOTE: (a) is the factor of safety for overturning;
(b) is the location of the resultant from the toe;
(c) is the factor of safety for sliding with the benefit of
resistance from the shear key.

APPENDIX G

DRAWINGS



DAM

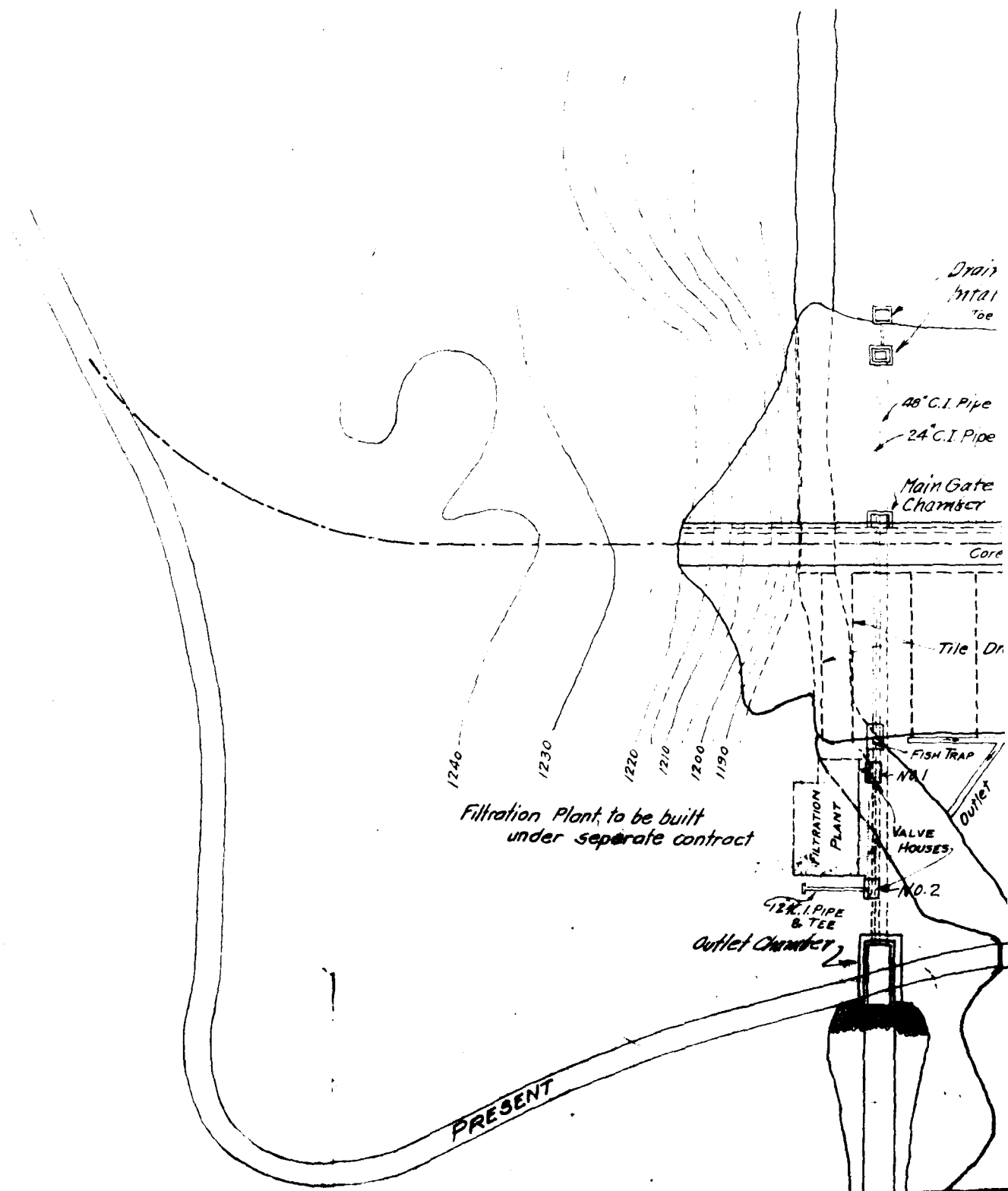


TOPOGRAPHIC MAP

CLEAR LAKE DAM

List of Drawings

	<u>Drawing Number</u>
General Layout of Dam	3
Plan and Longitudinal Section of Dam and Core-Wall	4
Roadway and Dam Sections	15
General Layout - Alteration 1	16
New Water Filtration Plant	57/50001
Change In Core Wall	Dated 1/18/25
Repairs to Bridge & Spillway Plan & Details	66/5038
Sections	66/5039



*Filtration Plant to be built
under separate contract*

PRESENT

*Drain
Ht. 1
Toe*

*48" C.I. Pipe
24" C.I. Pipe*

*Main Gate
Chamber*

Core

Tile Dr.

FISH TRAP

NO. 1

VALVE HOUSES

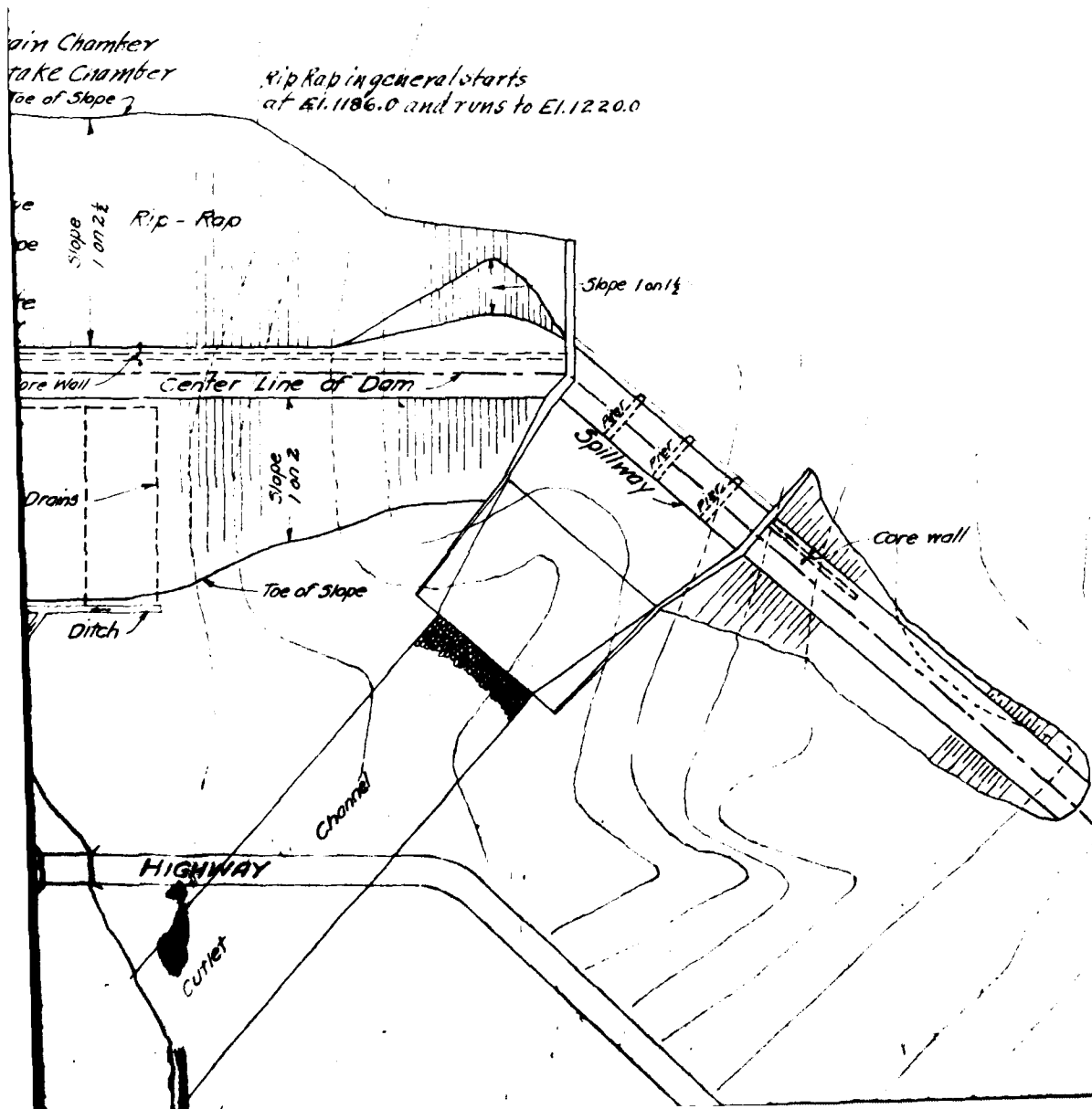
NO. 2

*12" I. PIPE
& TEE*

Outlet Chamber

Outlet

2

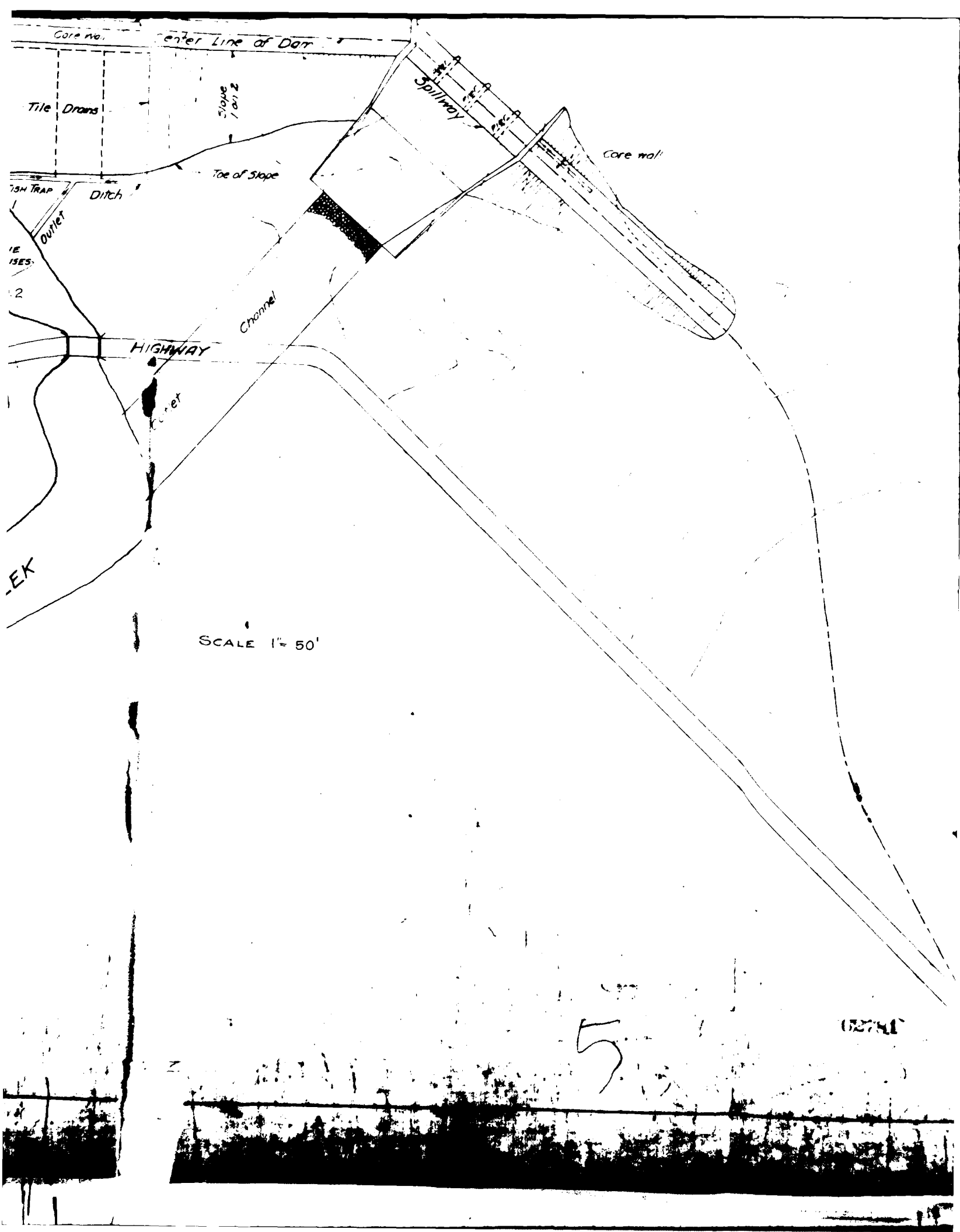


Approved & Submitted Apr. 2, 1924

Thos. J. Morrison Division Engineer.

Examined and Approved May 19, 1924.

Amos W. Chapman Deputy State Engineer.



Division Engineer

May 19 1911

Deputy State Engineer

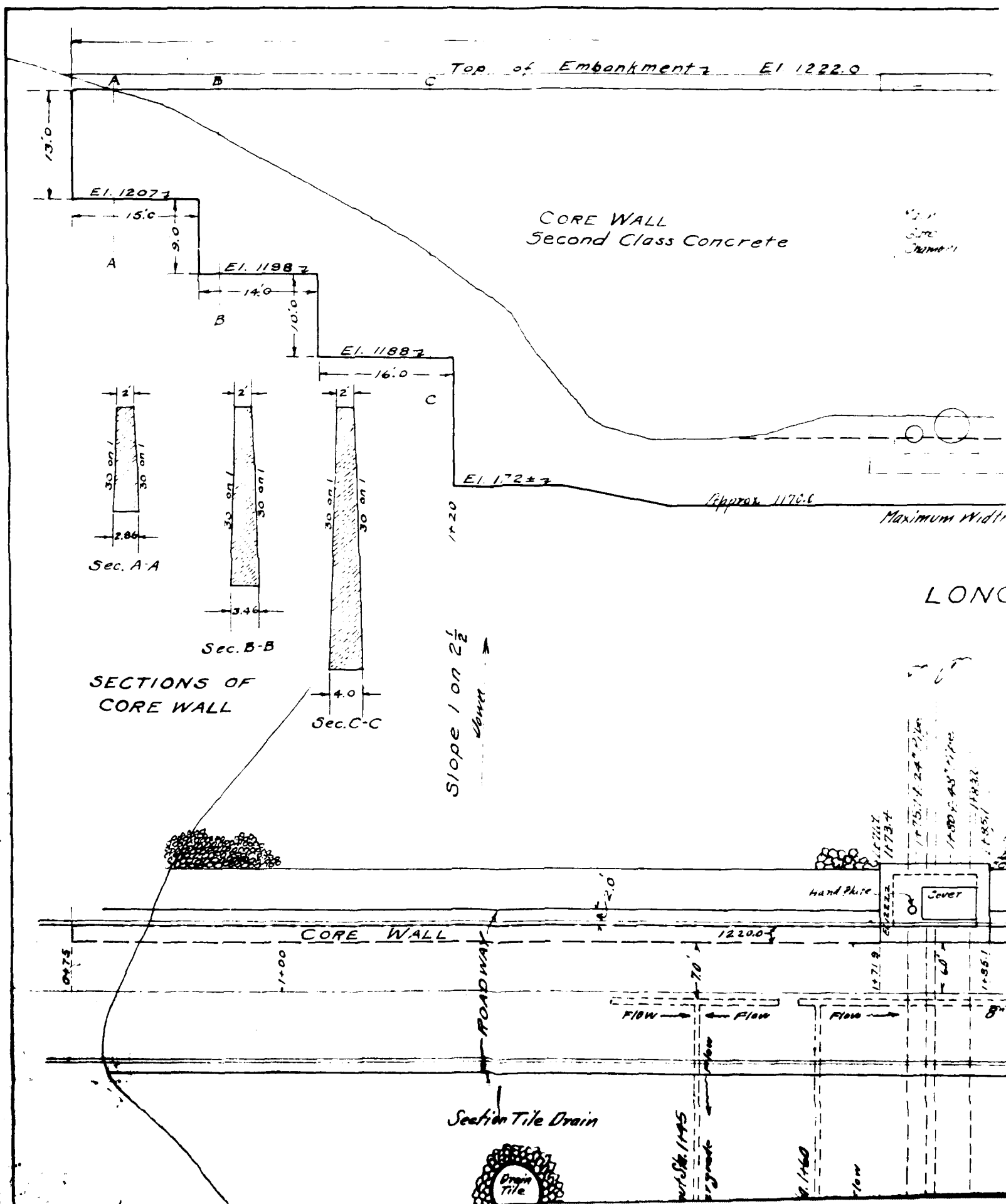
State of New York

DEPARTMENT OF STATE ENGINEER AND SURVEYOR

WATER SUPPLY SYSTEM FOR GOWANDA HOMEOPATHIC STATE HOSPITAL CONTRACT

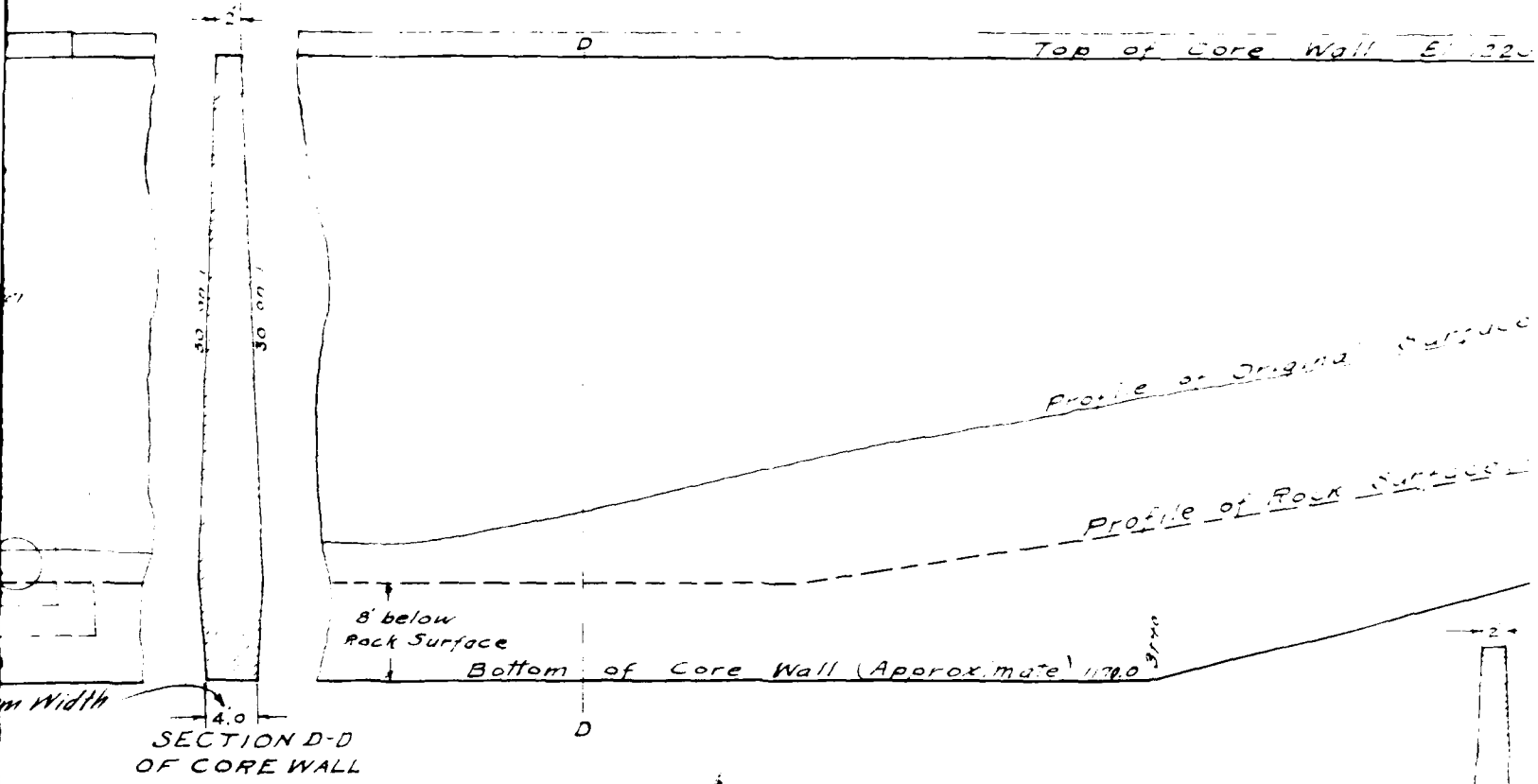
FOR CONSTRUCTING AN EARTH DAM, EARTH
CORE-WALL, CONCRETE CHILLER, AND WORK
IN THE TOWN OF NORTH OCEAN, WEST

Chapter 224, Laws of 1907

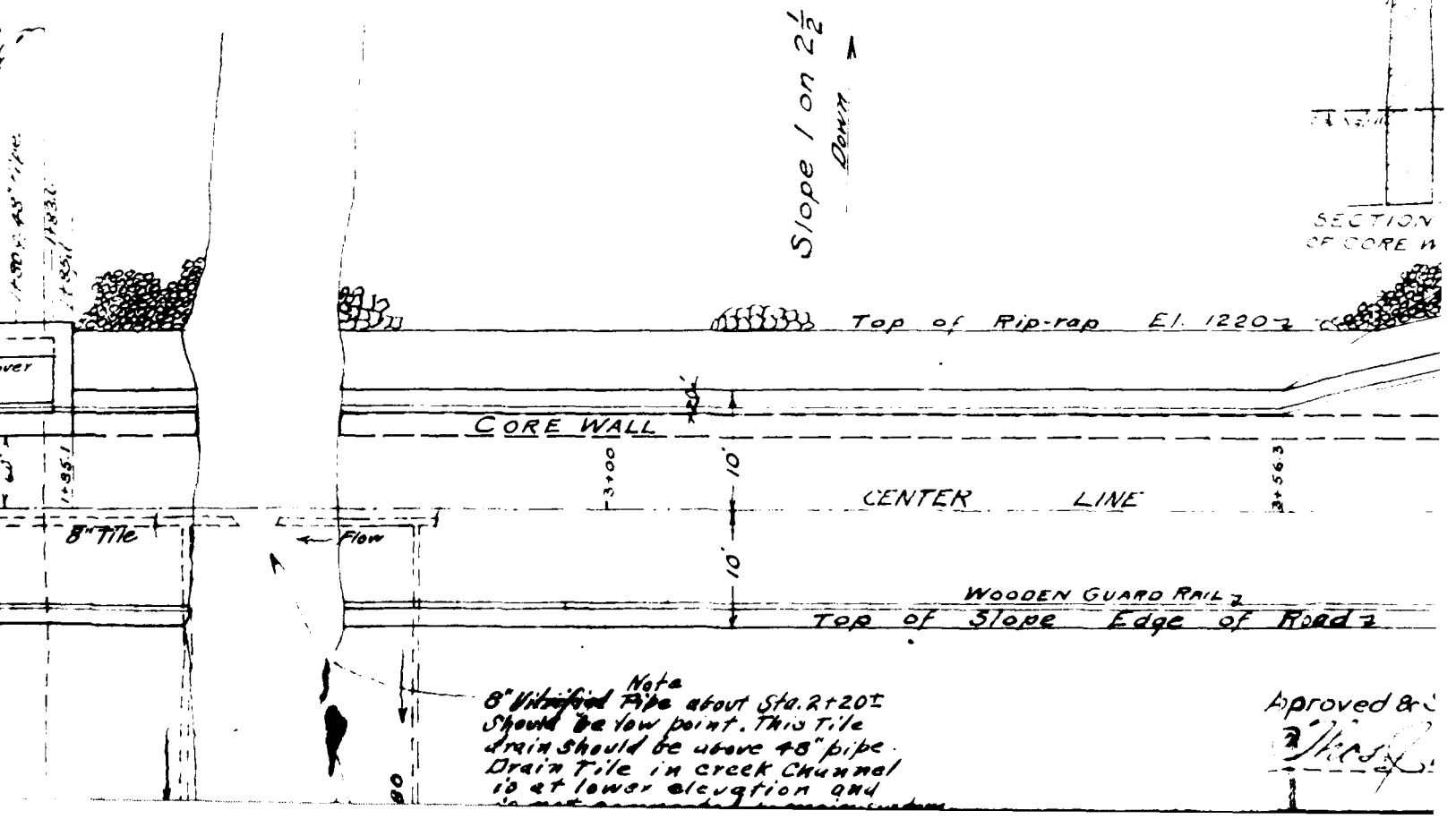


2

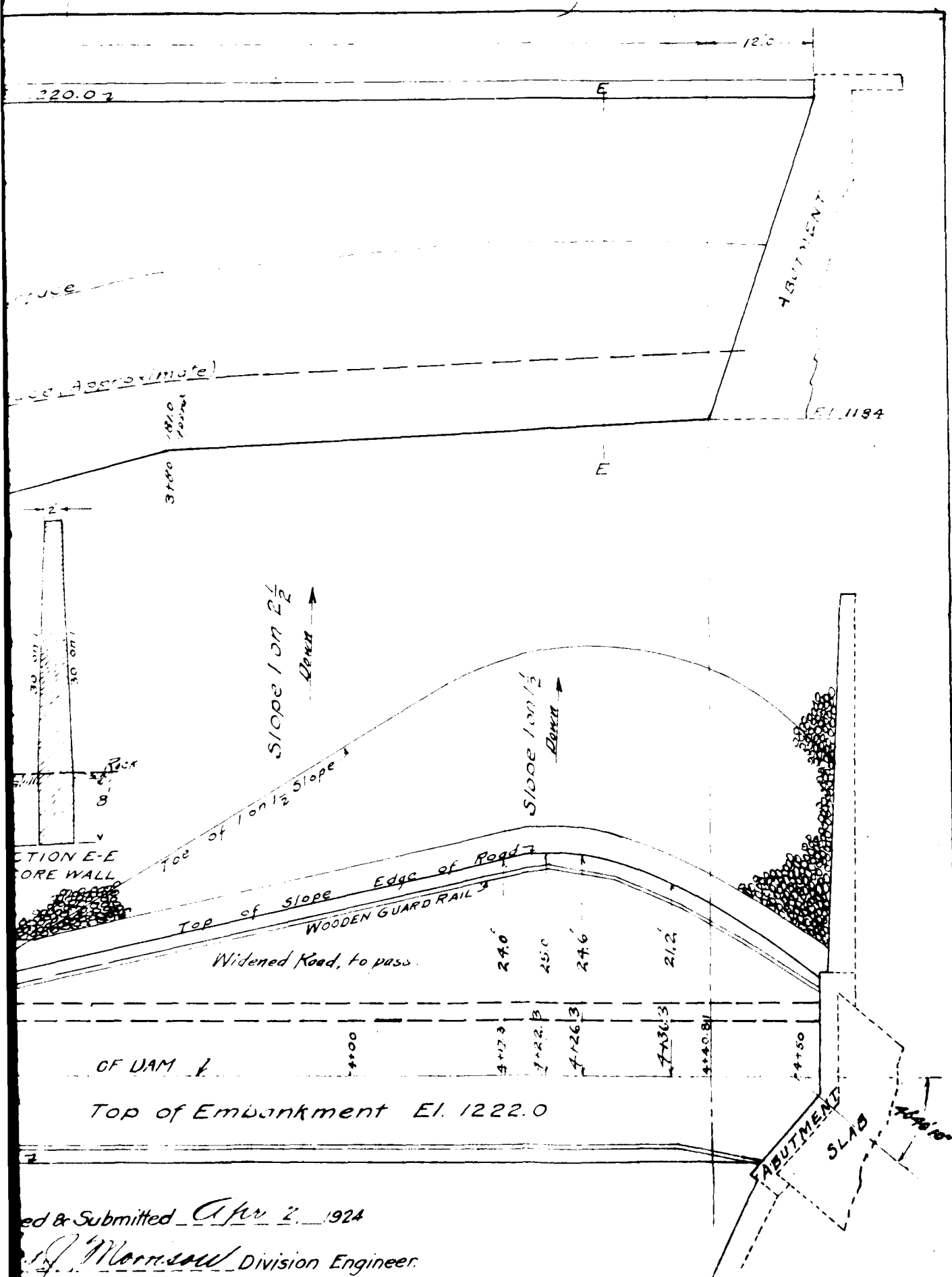
365.81



LONGITUDINAL SECTION



Approved & S. J. [Signature]

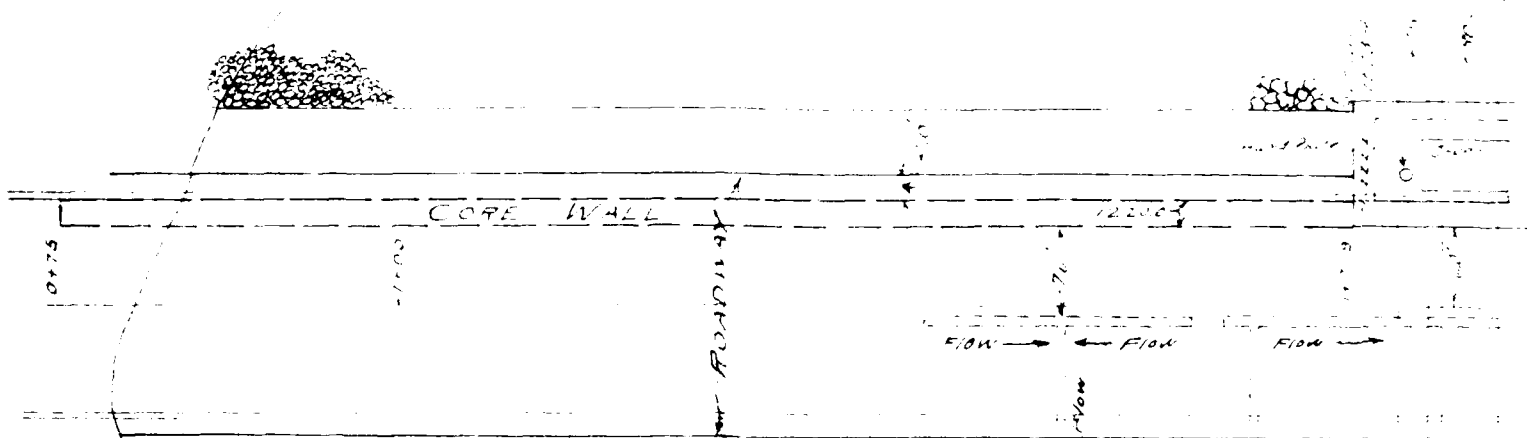


ed & Submitted Apr 2, 1924
 J. Morrisall Division Engineer.

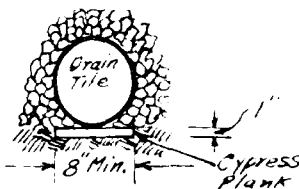
SECTION ONE
CORE WALL

Sec. C-C

SLOPE 1 on 2



Section Tile Drain



1 cu. foot of stone or gravel as specified per lineal foot of tile drain. Paid for as Lining.

SLOPE 1 on 2
Down

6" Tile
in Creek Channel or on gravel

6" Tile
about 100

24" C.I. PIPE

48" C.I. PIPE

Creek Channel

MADE BY C.V. O'Malley
TRACED BY S. L. Hanks, Feb. 1944
CHECKED BY L. L. Baker

AD-A091 131

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. CLEAR LAKE DAM (INVENTORY NUMBER N--ETC(U)
MAY 80 G KOCH

DACW51-79-C-0001

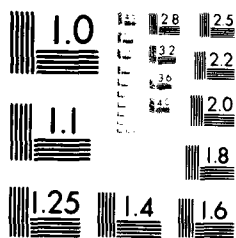
NL

UNCLASSIFIED

2-2

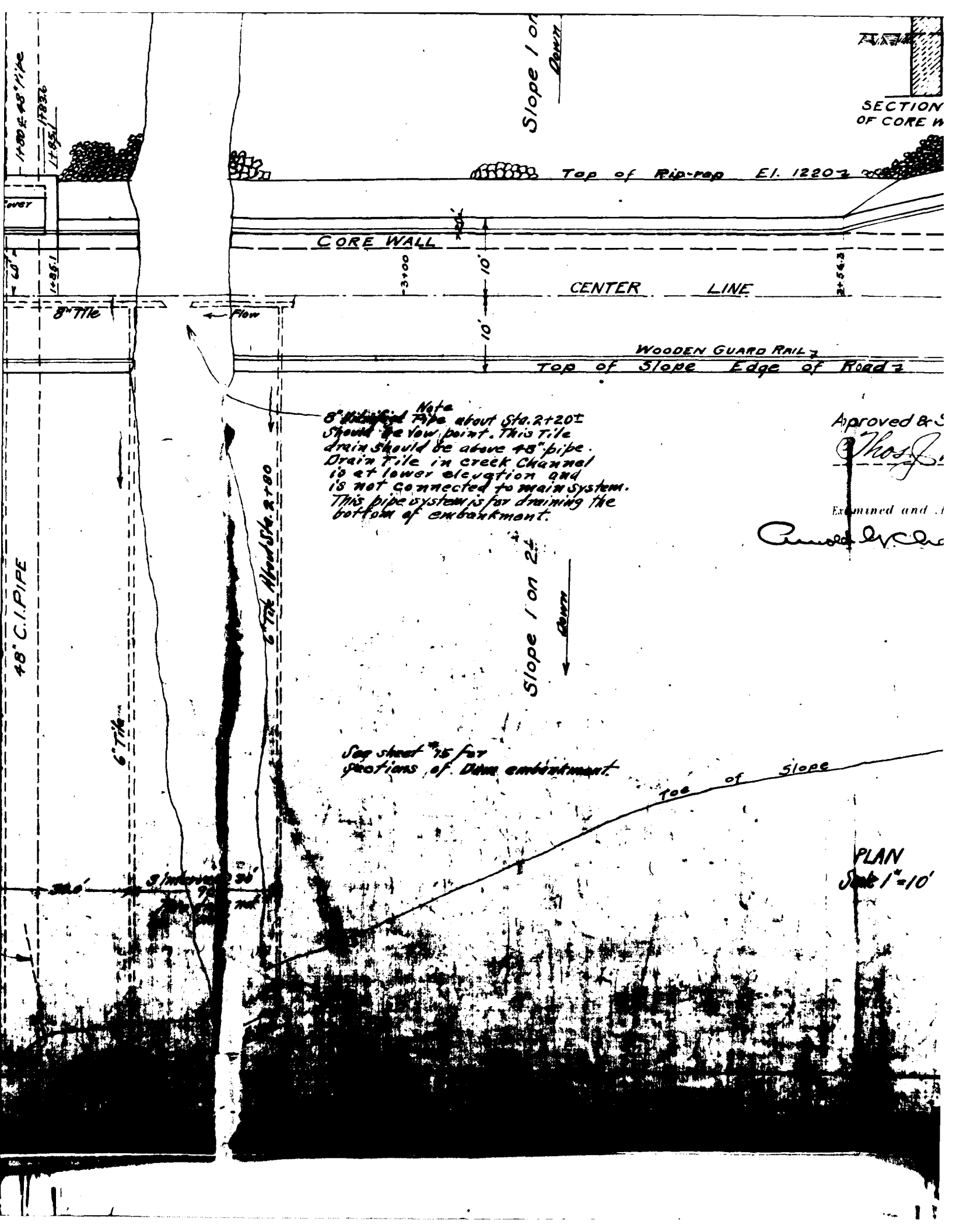
8-2

END
DATE
FILMED
11-80
DTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SECTION
OF CORE W



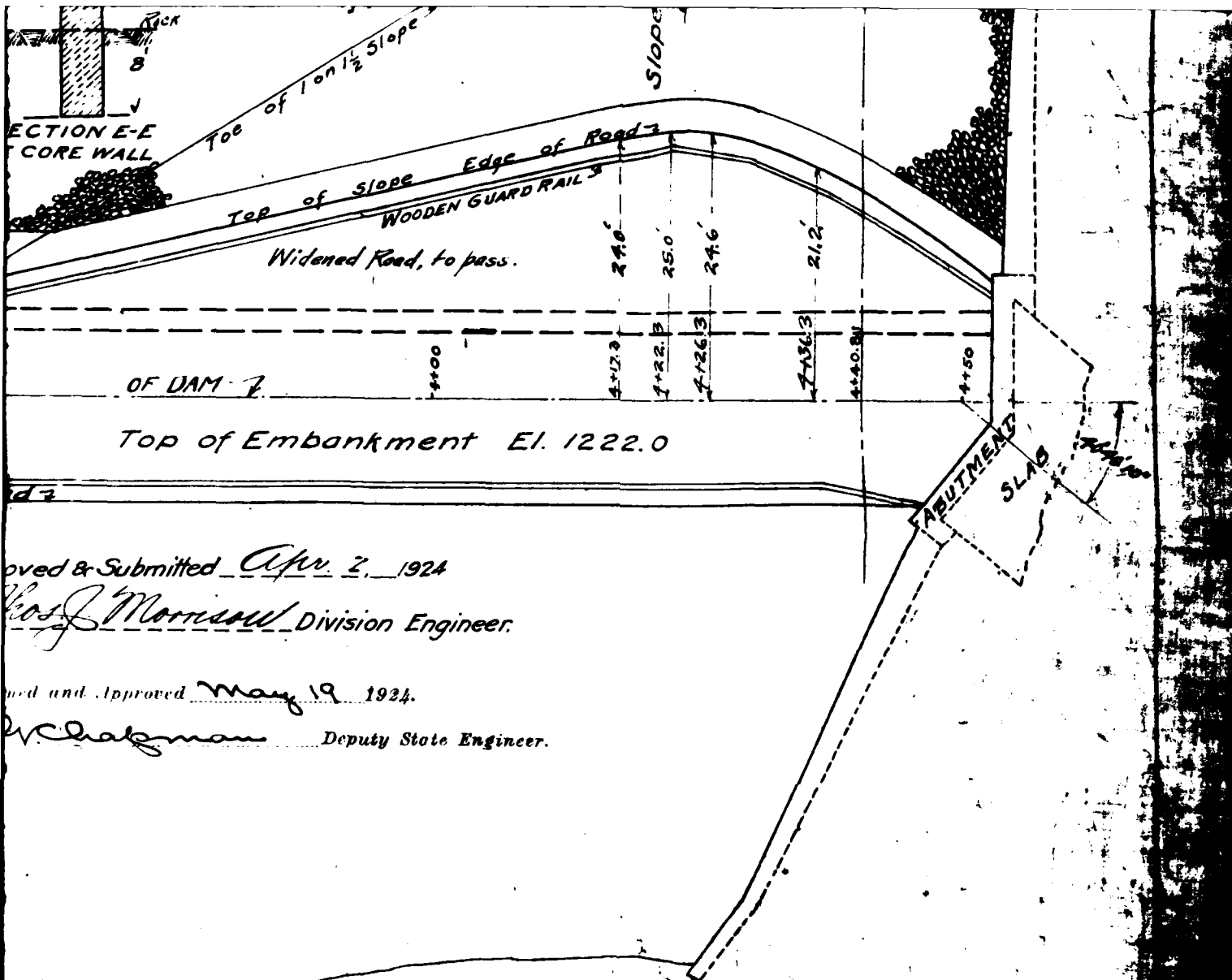
Note
8" tile pipe about Sta. 2+20±
should be low point. This tile
drain should be above 48" pipe.
Drain tile in creek channel
is at lower elevation and
is not connected to main system.
This pipe system is for draining the
bottom of embankment.

Approved & S
Thos. J.

Examined and
Amos L. C.

See sheet 15 for
sections of Dam embankment.

PLAN
Scale 1"=10'



Approved & Submitted Apr. 2, 1924
W. J. Morrissey Division Engineer.
 Approved May 19, 1924
W. Chapman Deputy State Engineer.

State of New York

DEPARTMENT OF STATE ENGINEER AND SURVEYOR

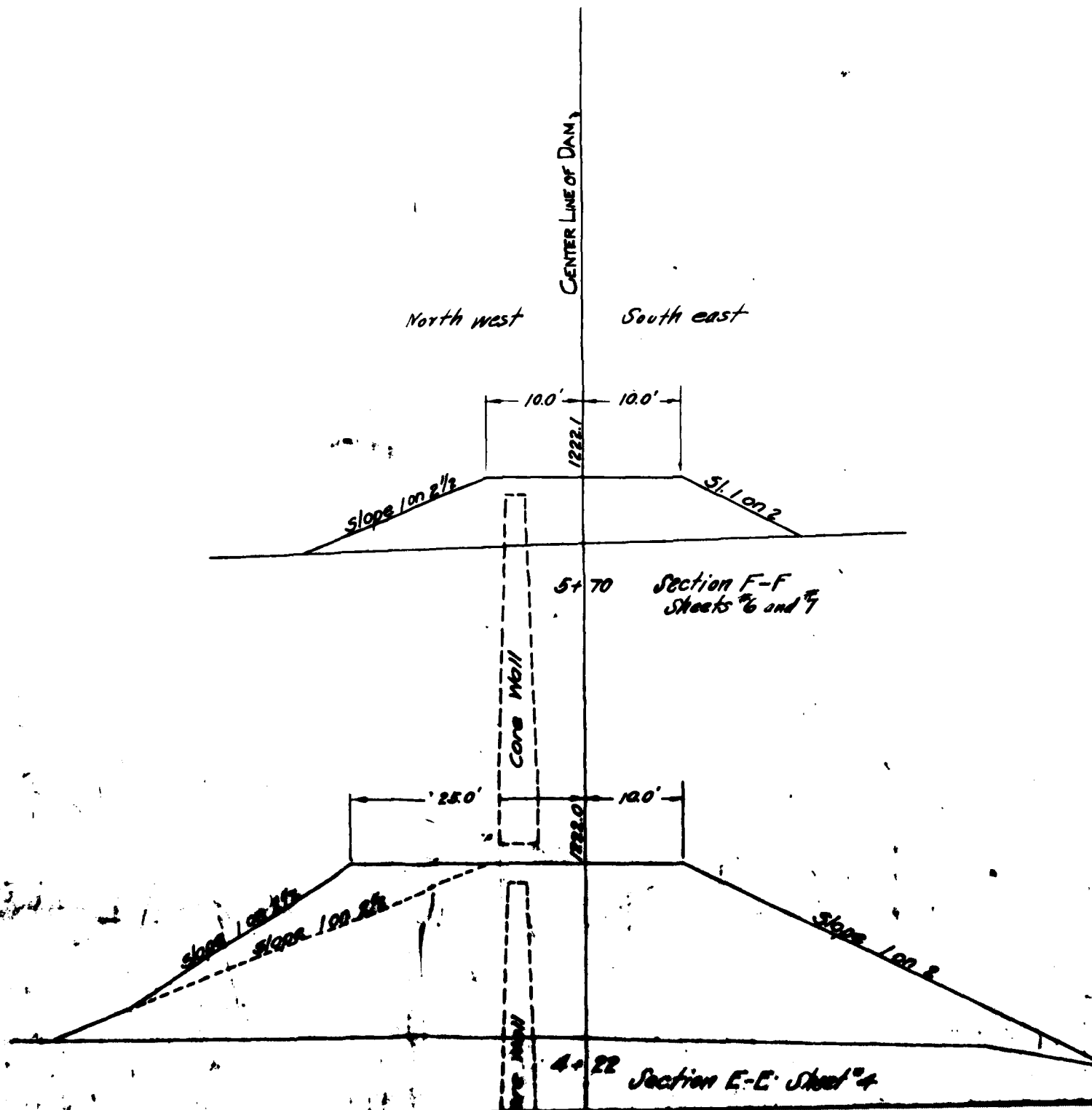
WATER SUPPLY SYSTEM FOR GOWANDA HOMEOPATHIC STATE HOSPITAL CONTRACT 1

FOR CONSTRUCTING AN EARTH DAM WITH CONCRETE
 CORE-WALL, CONCRETE SPILLWAY AND DAM
 IN THE TOWN OF NORTH CANTON, CATTARAUGUS COUNTY, NEW YORK

U27.82

PLANNING

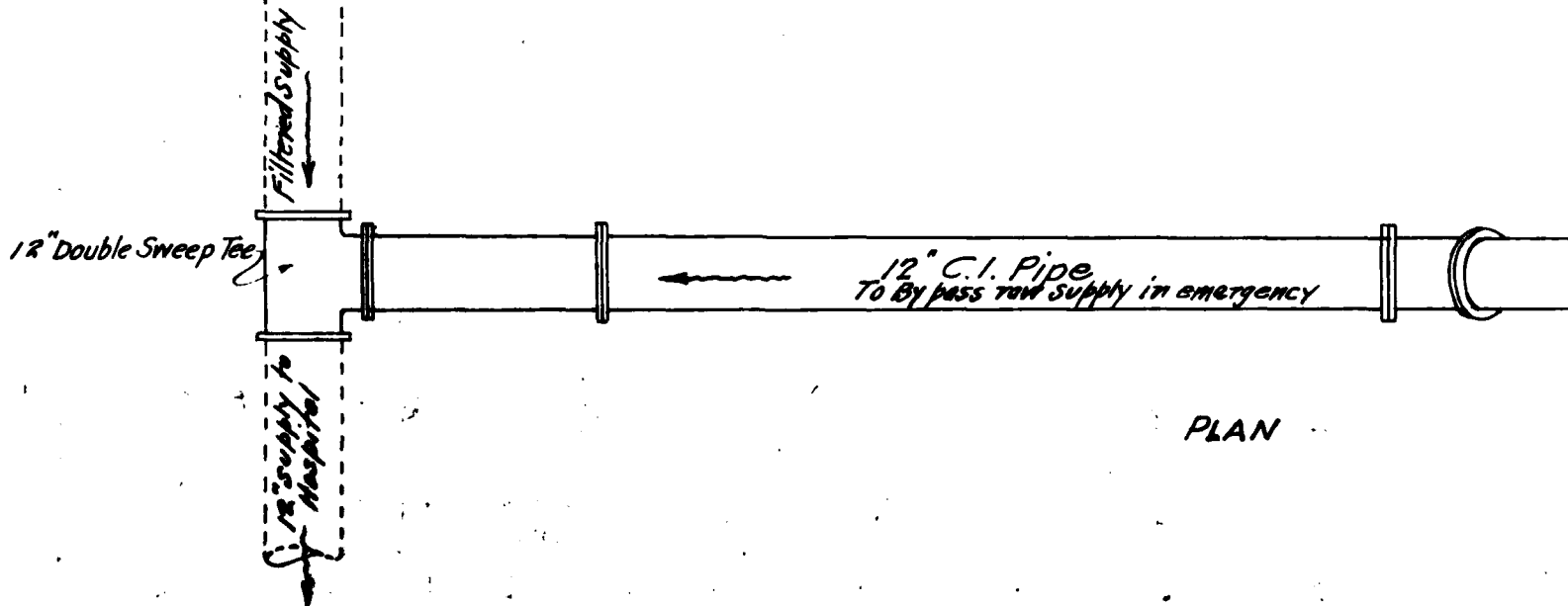
1



2

Clear Water Well

FILTRATION PLANT TO BE
UNDER FUTURE CONTR.

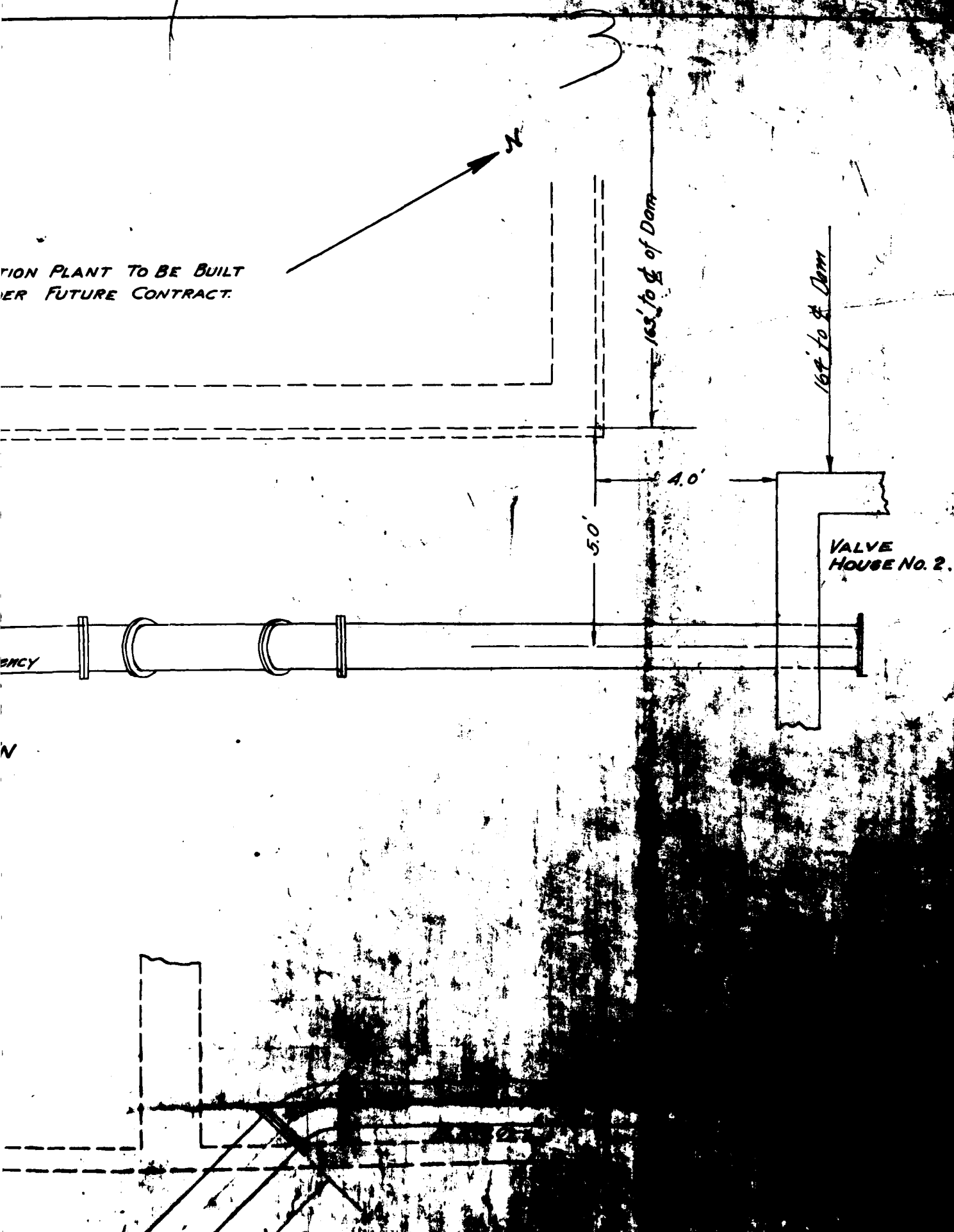


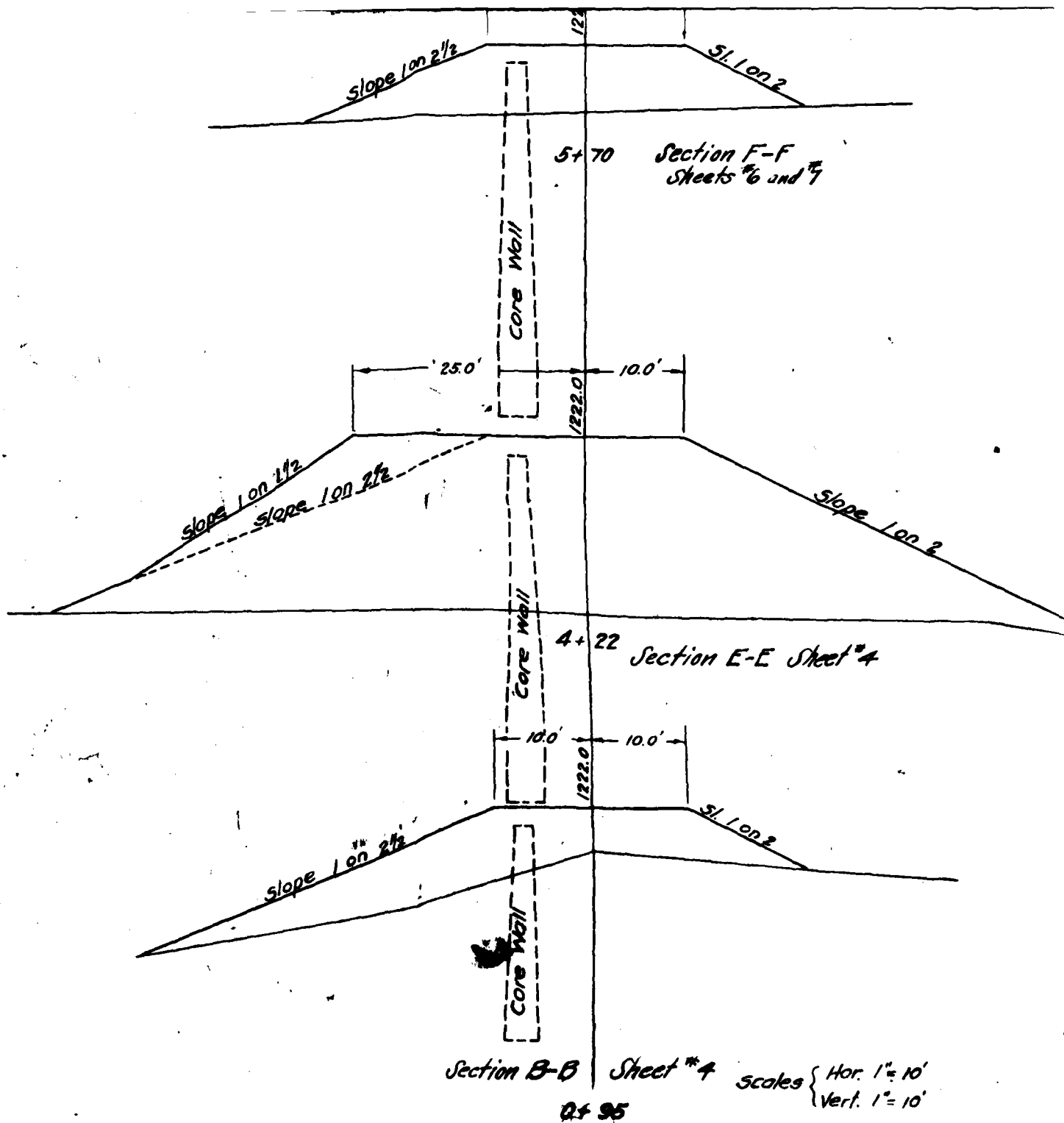
PLAN

ION PLANT TO BE BUILT
ER FUTURE CONTRACT.

ENCY

N





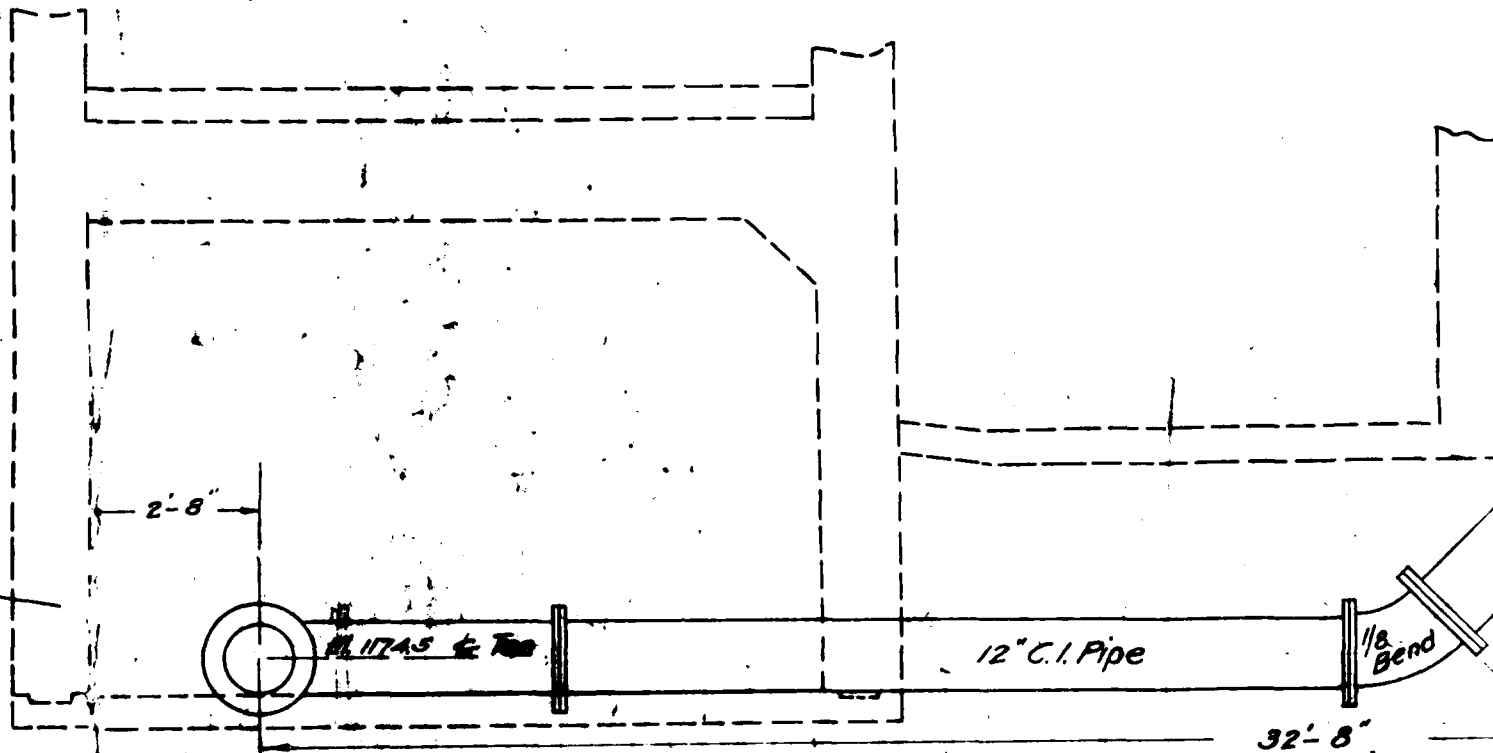
EXTRA SECTIONS THROUGH ROADWAY
& DAM EMBANKMENT.

Drawn by E. C. M. Mally

Checked by J. L. Smith Mar. 1924

Designed by E. C. M. Mally

PLAN



SECTION

Scale 1" = 2'

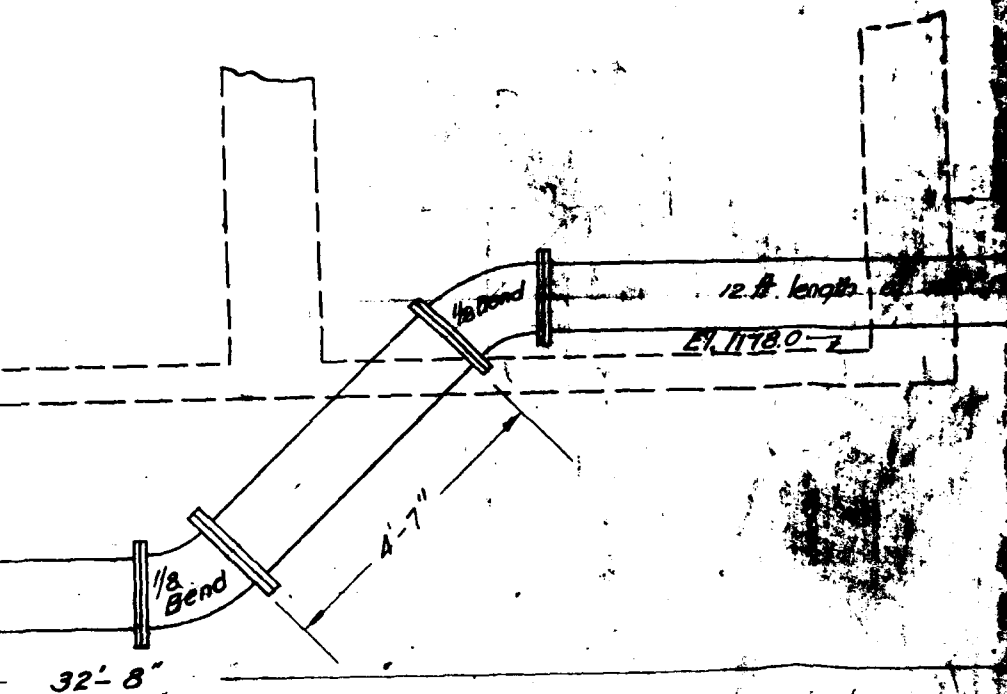
BY-PASS PIPE LINE TO CONVEY WATER
AROUND FILTRATION PLANT.

Approved & Submitted *Apr. 2, 1924*

Chas. J. Morriss Division Engineer.

Examined and Approved *May 19, 1924*

Amos D. Chapman Deputy State Engineer.



ION

1" = 2'

WATER
PLANT.

24

ineer.

Engineer.

State of New York

DEPARTMENT OF STATE ENGINEERING

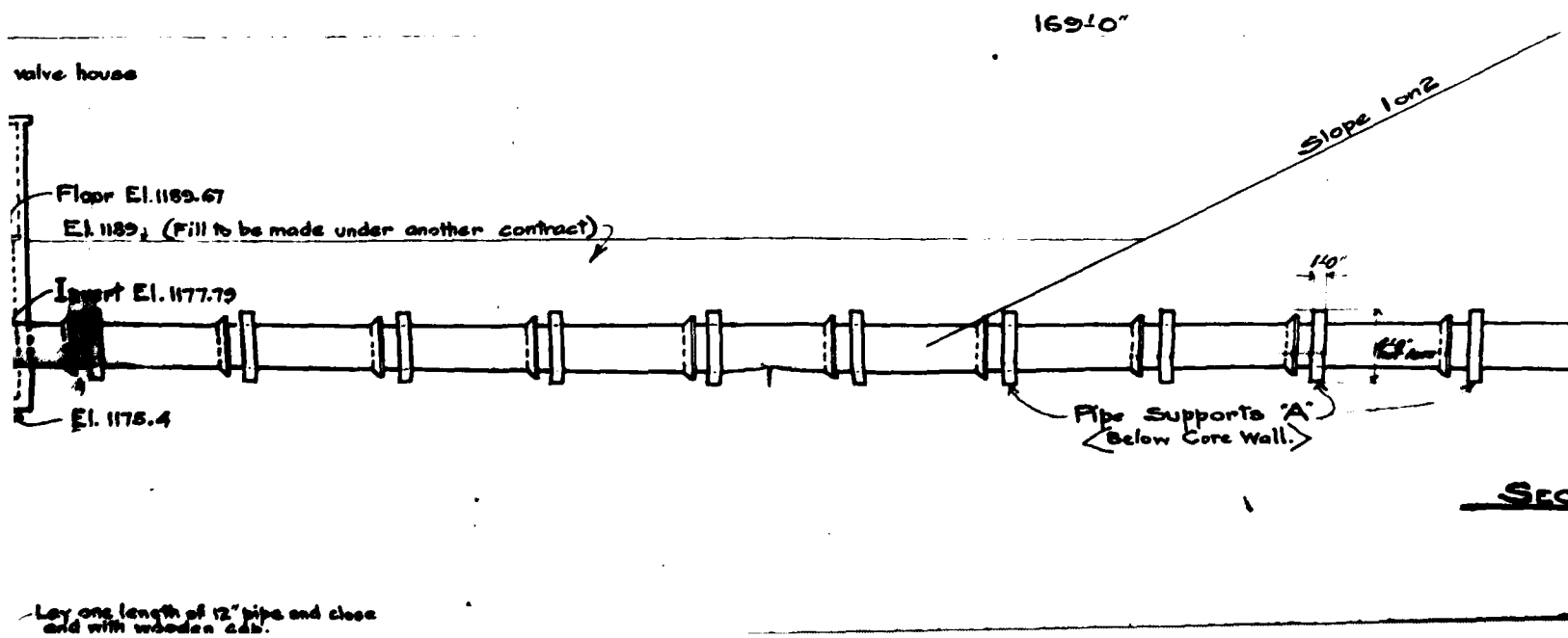
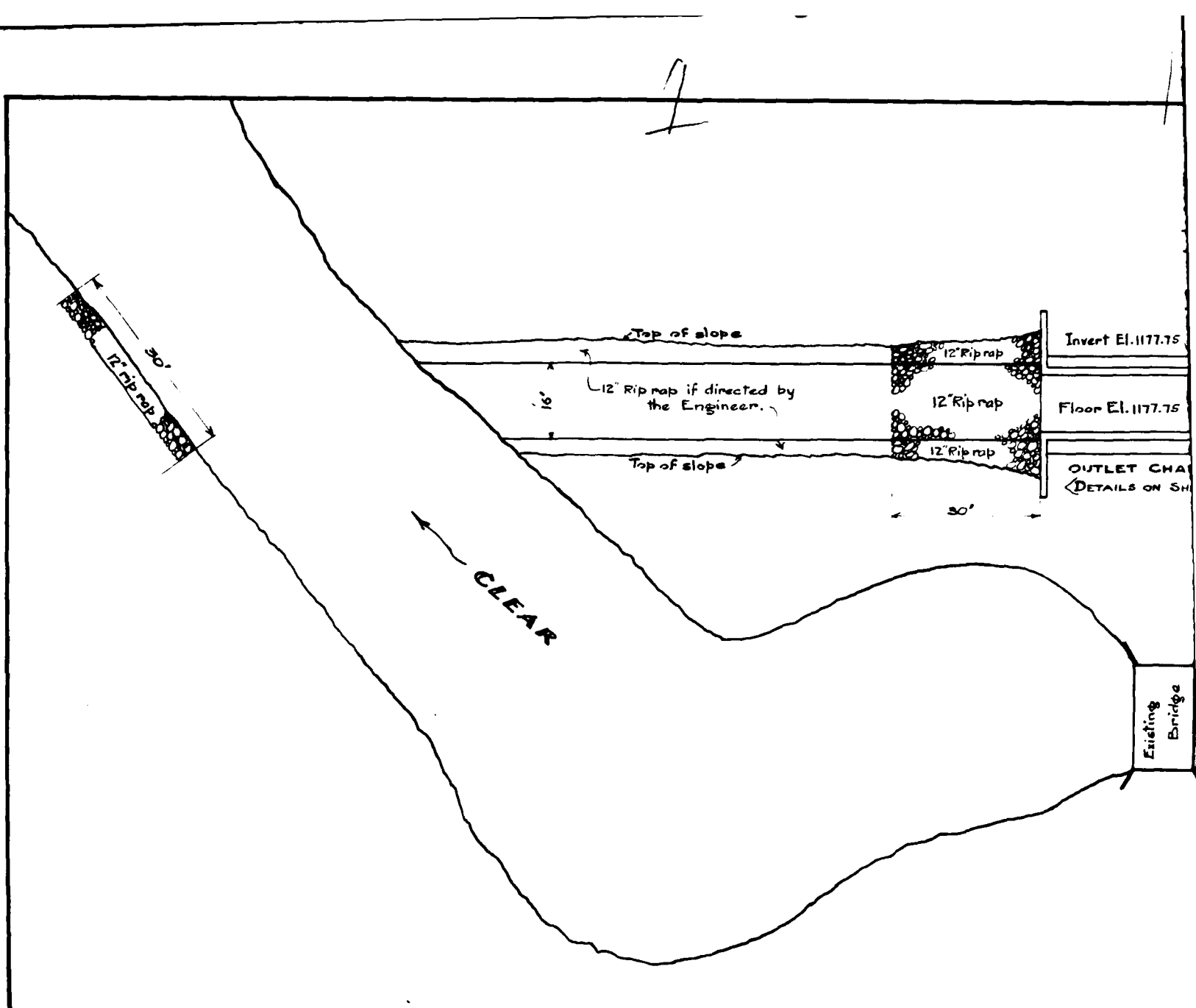
WATER SUPPLY SYSTEM FOR GOWANDA
HOMEOWNERS ASSOCIATION

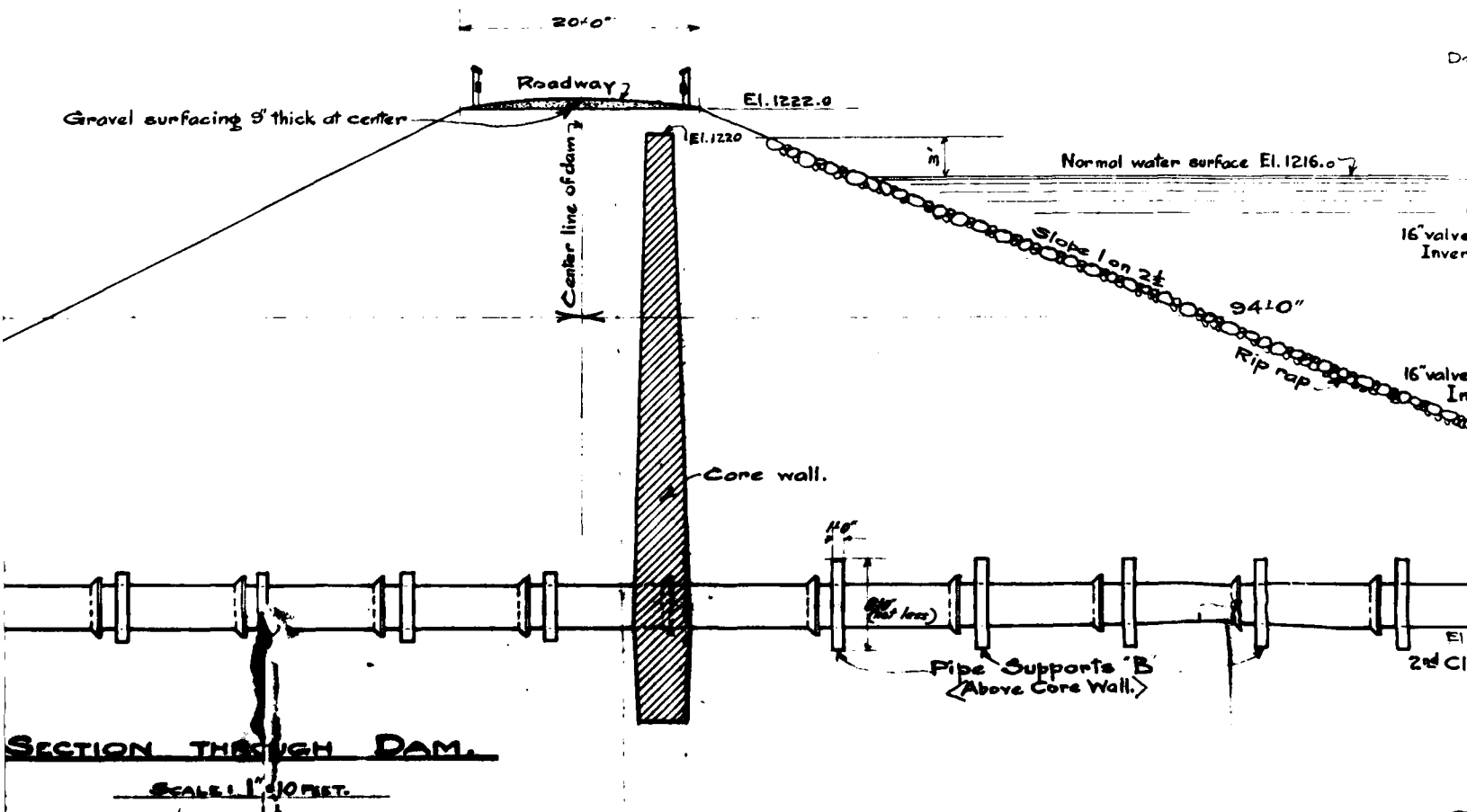
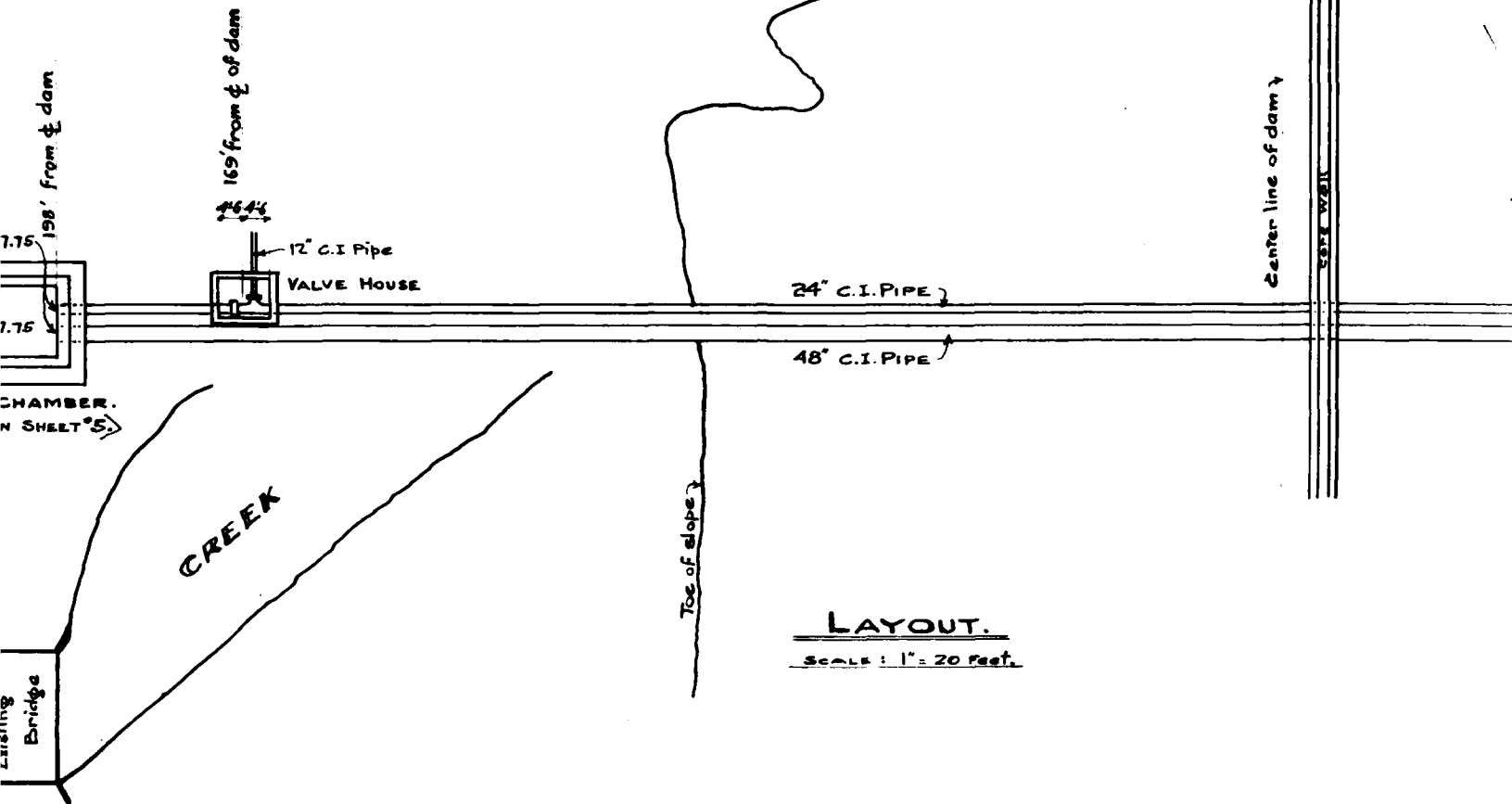
FOR CONSTRUCTION OF
CORE-WALL CONCRETE
IN THE TOWN OF GOWANDA

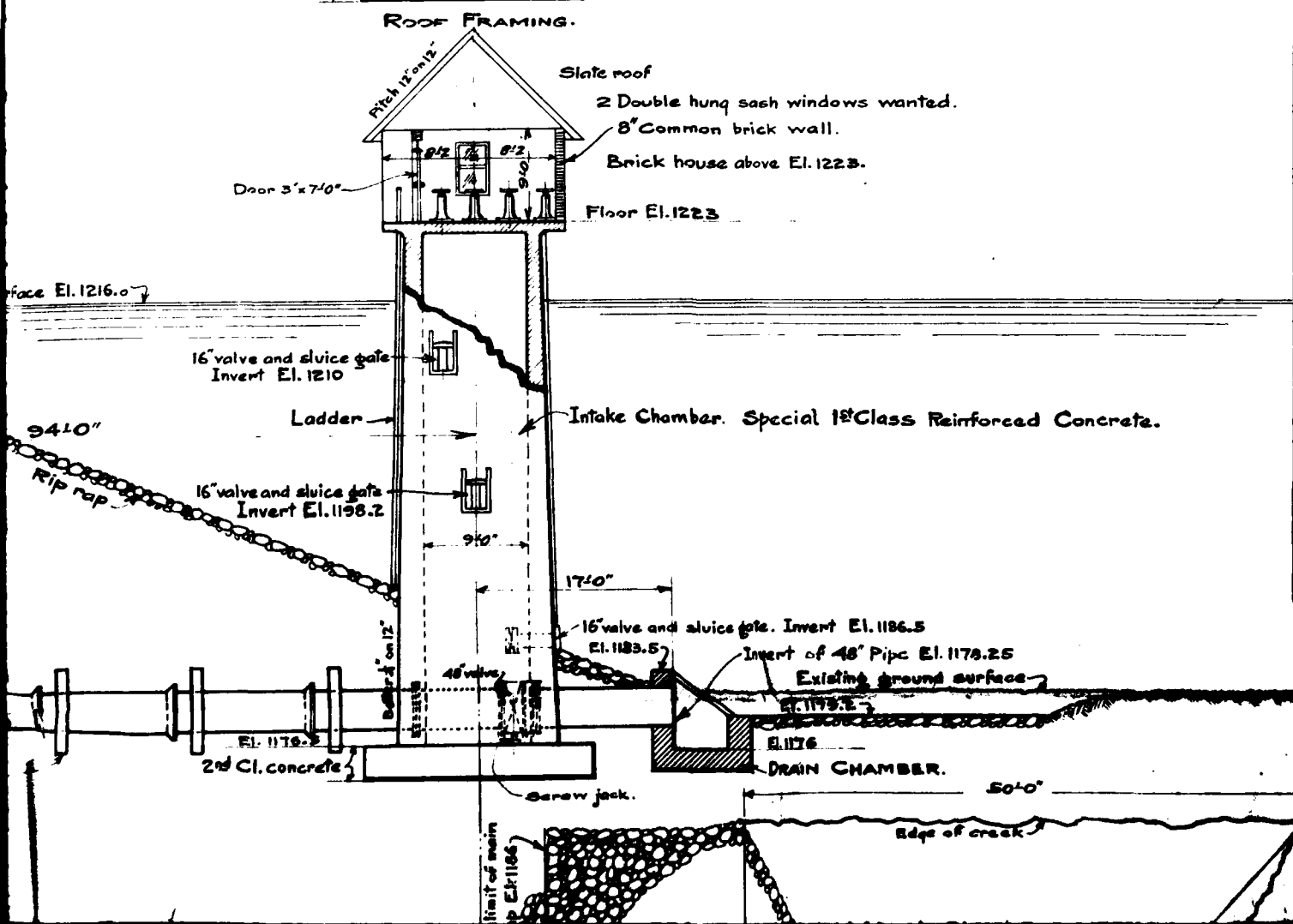
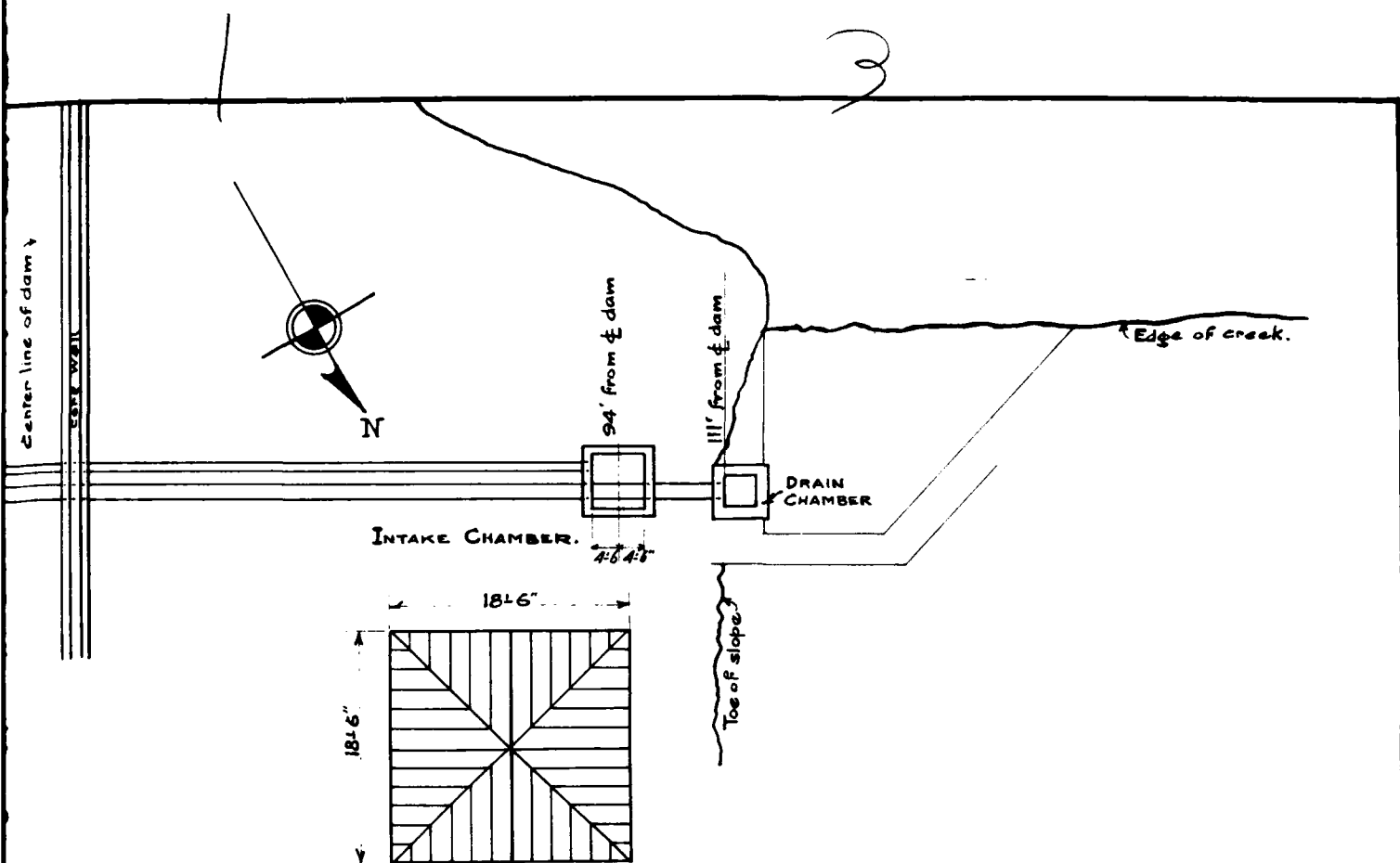
Chapter 225, Laws of 1902

12793

ROADWAY







169' 0"

valve house

Floor El. 1189.67

El. 1189 (Fill to be made under another contract)

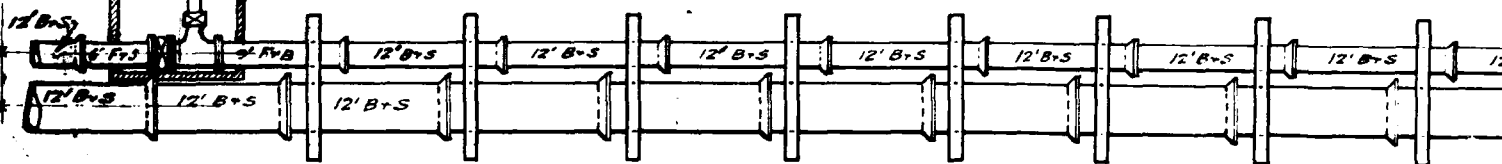
Invert El. 1177.79

El. 1175.4

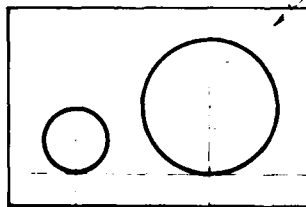
Pipe Support
Below Core

Lay one length of 12" pipe and close
end with wooden cap.

12" F.F.
VALVE HOUSE. (For details see sheet 12.)



2nd Class Concrete



6' 0"

See note.

* Varies *

11' 40"

PIPE SUPPORTS 'A'

SCALE 1" = 4' NET.

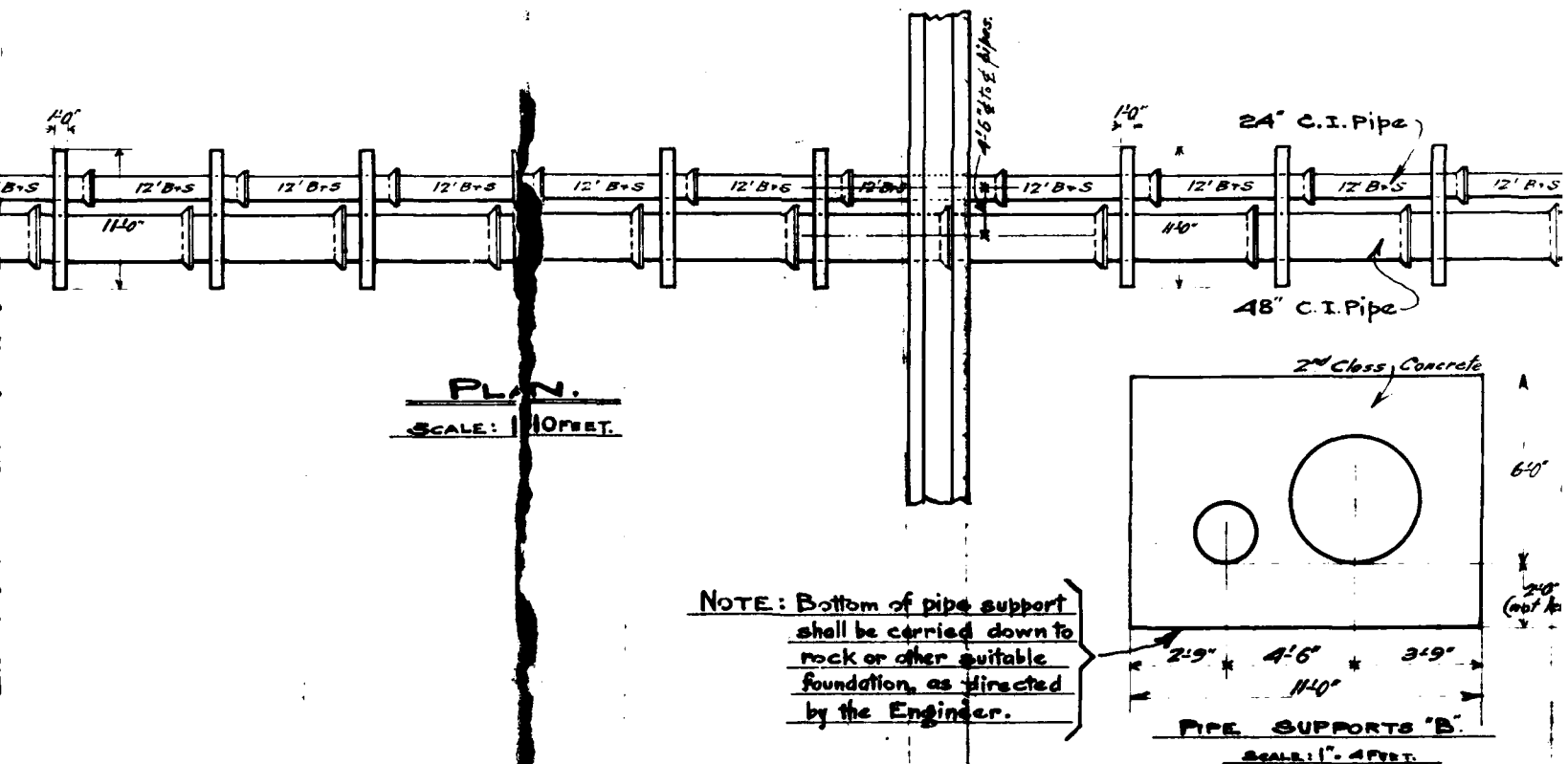
MADE BY: H. H. Benedict, March, 1925

TRACED BY: J. M. ANDERSON, APRIL, 1925.

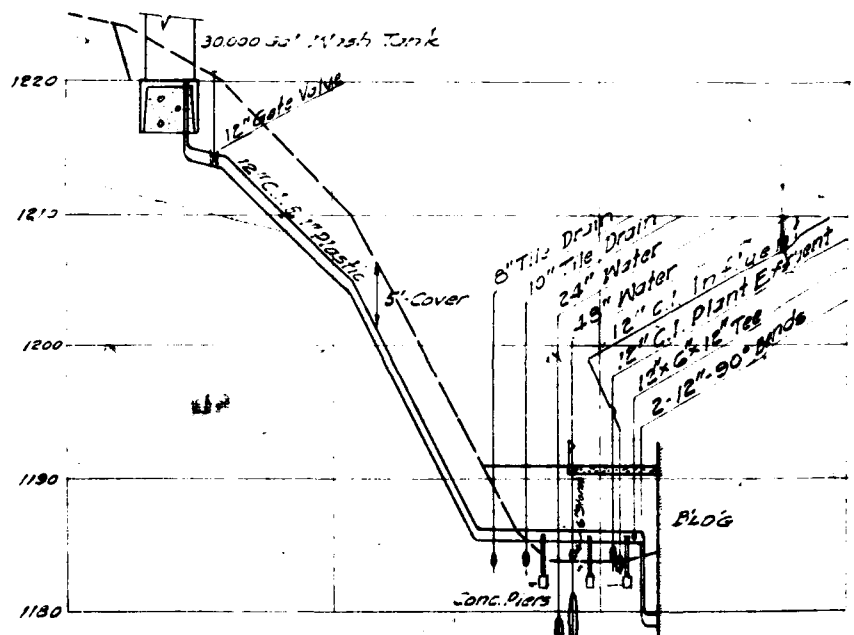
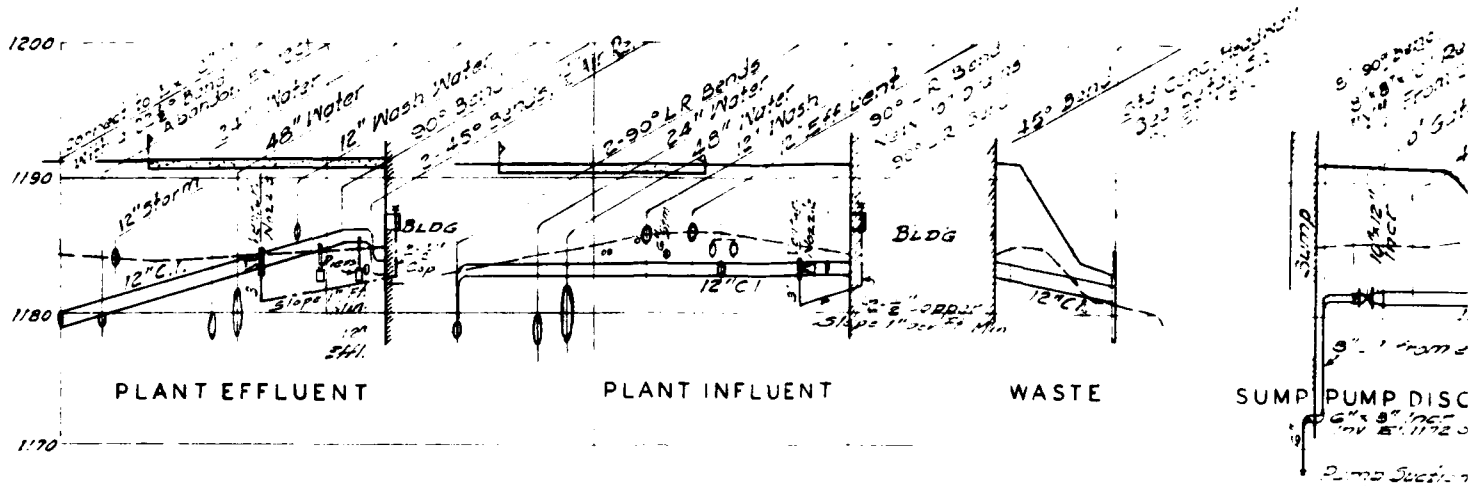
CHECKED BY: H. E. Bramford, April 17-1925

APPROVED BY: H. H. Wood, April 17-1925

4

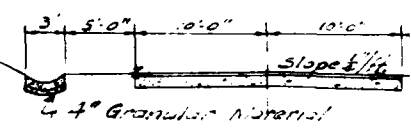


2



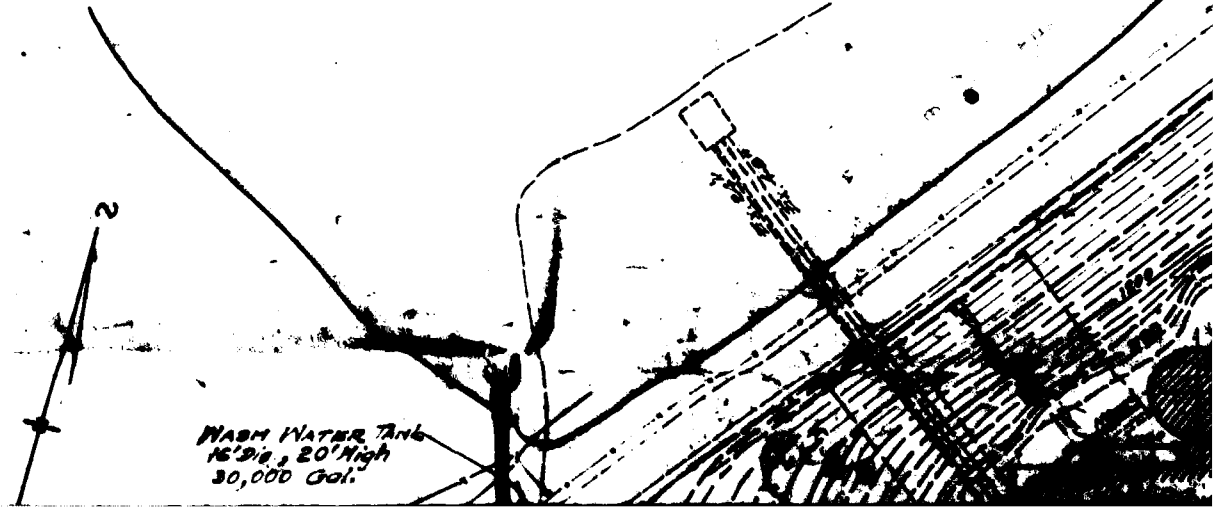
12" C.I. WASH WATER & PLASTIC TELL TALE

P R O



SECTION OF ROADWAY
SCALE 1" = 10'-0"

CLEAR RESERVOIR



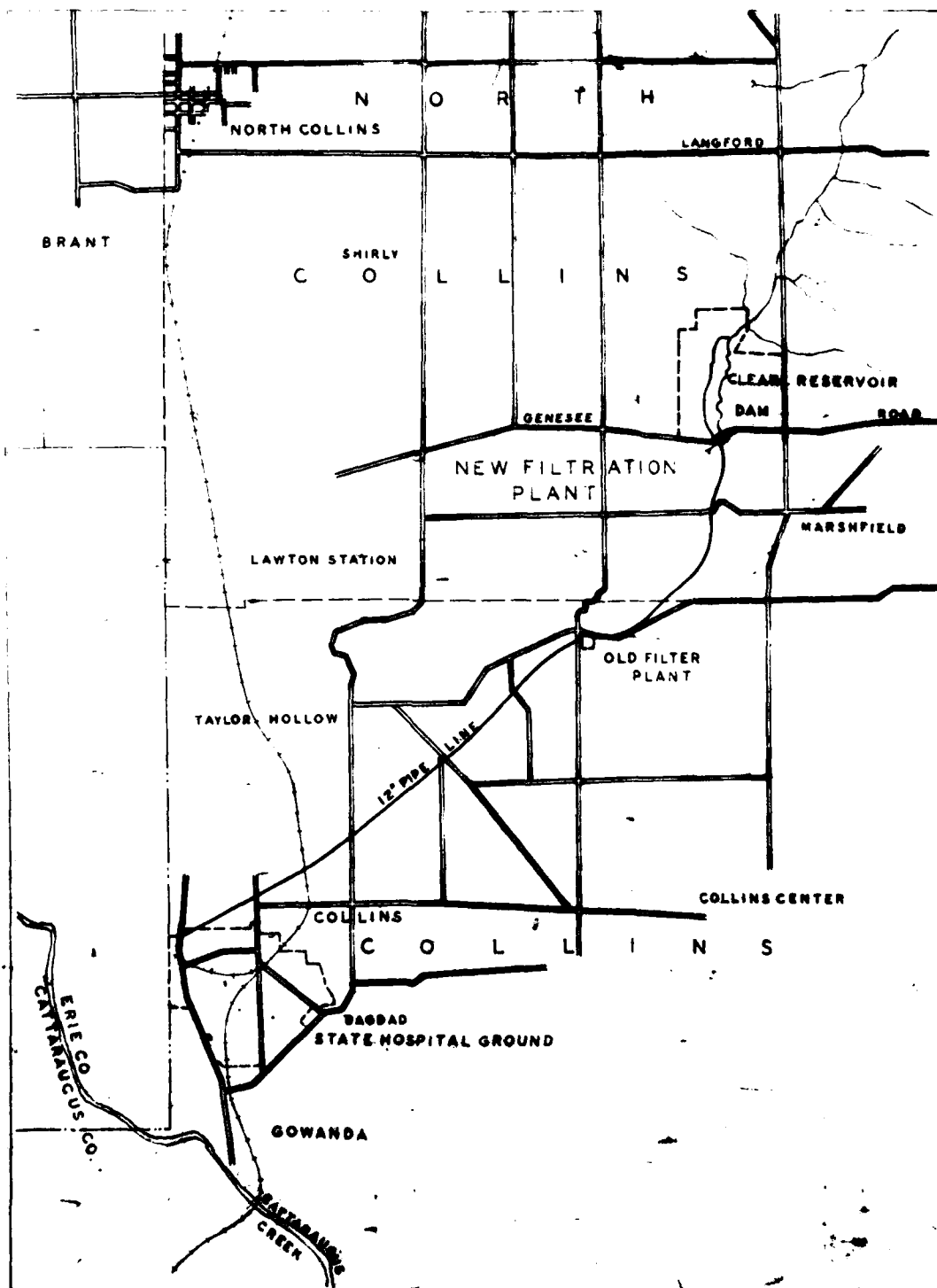
202-10000000

1/2" = 1'-0"



PIER DETAIL

1/2" = 1'-0"



VICINITY MAP

SCALE OF MILES

12" C.I. WASH WATER & PLASTIC TELL TALE

CLEAR RESERVOIR

WASH WATER T.I.C.
16" Dia., 20' High
30,000 Gals.

GENERAL

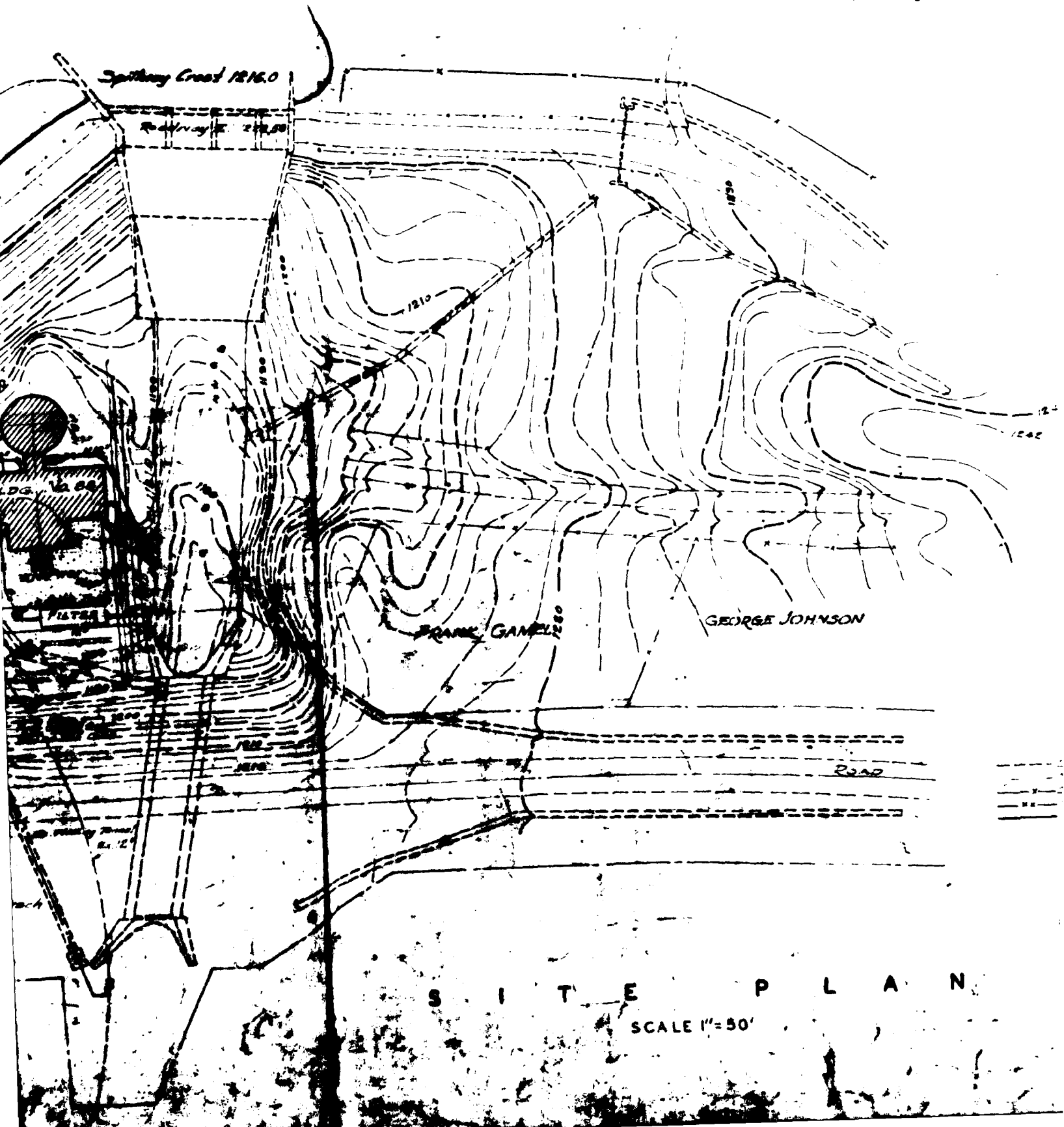
Note: Where Cast Iron Sewer
pipe is indicated, Cast Iron
water pipe shall be used.

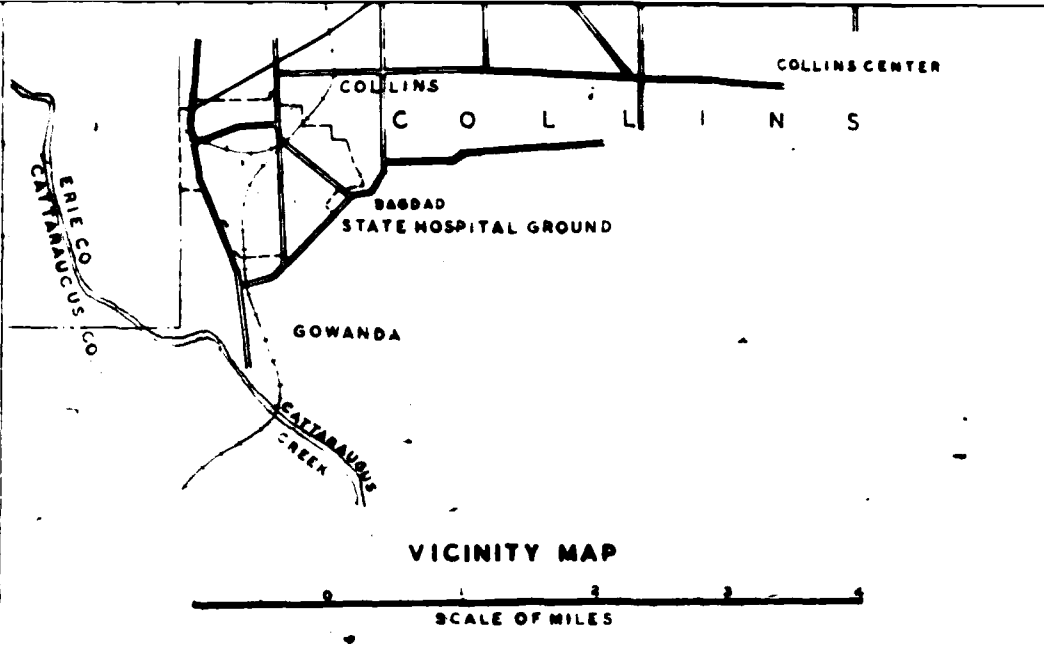
Connect new 12" Dia. h
with 2 lines as read

J. C. SEYER

CONCRETE FENCE

SCALE $\frac{1}{2}$ " = 1'-0"





STD DETAIL SH. 55/55001 of Companies Press Drawings.
(SHEET 31 OF 31)

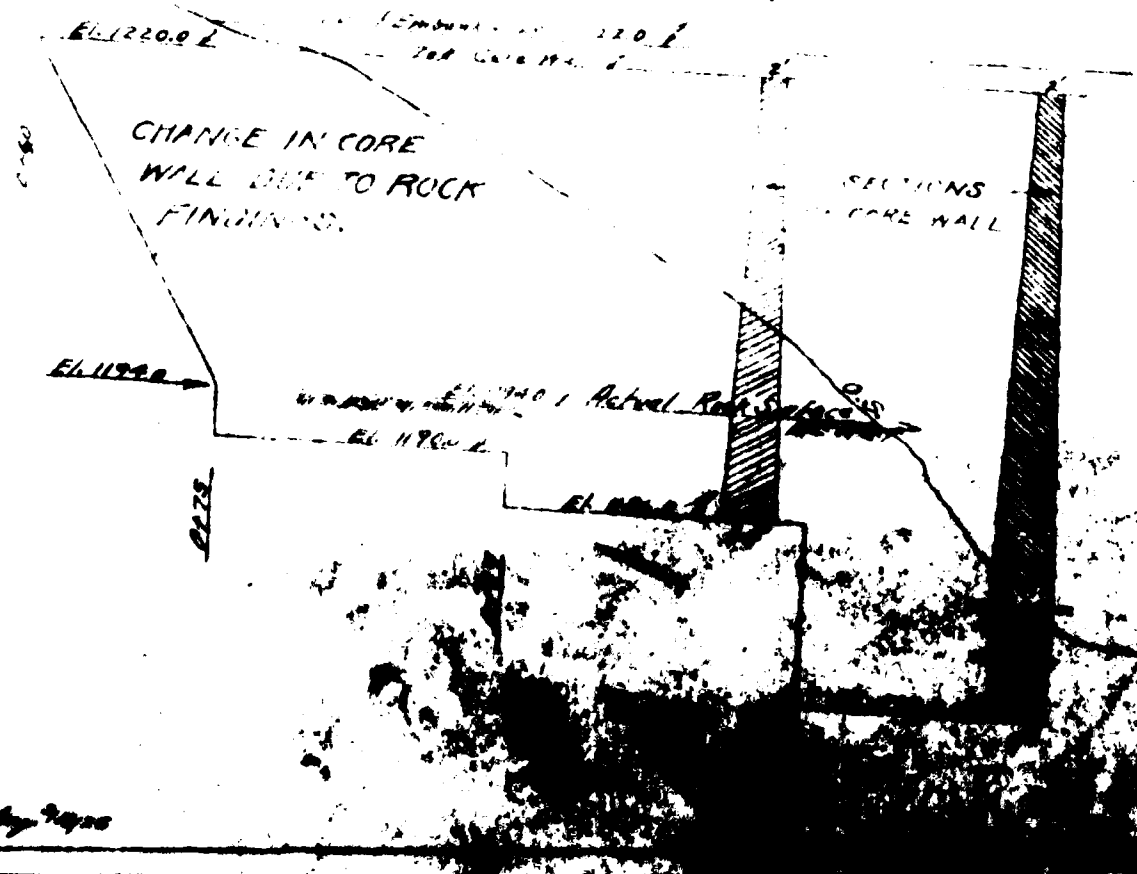
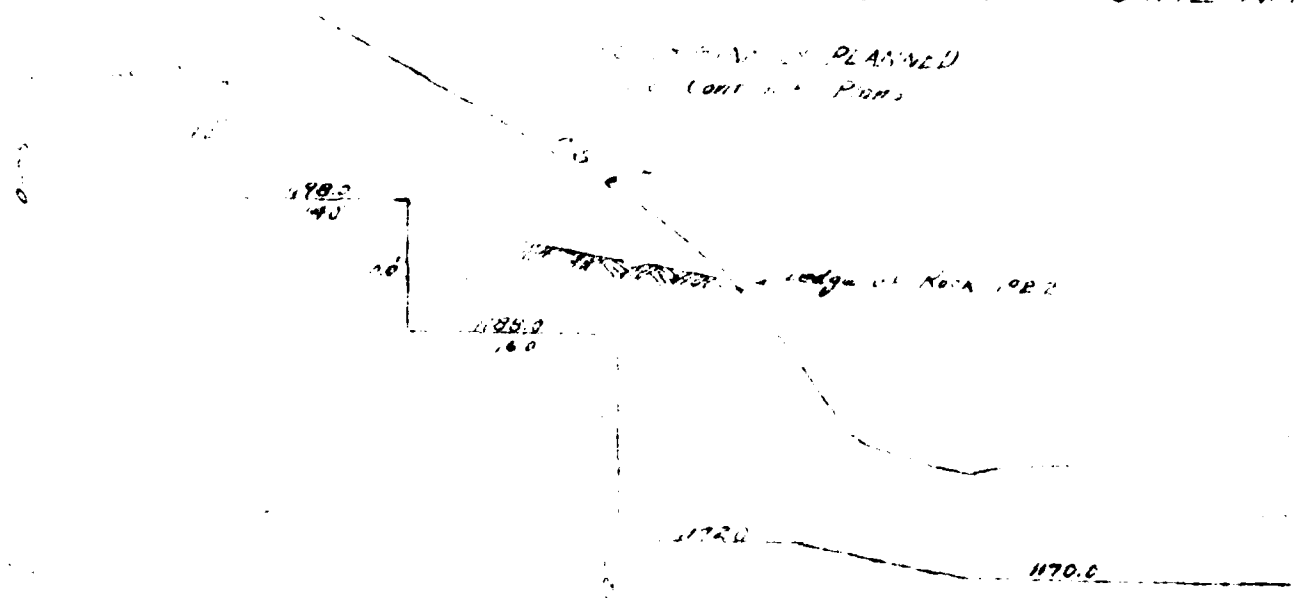
--- Existing Contours
--- New Contours
--- Supply Sewer, New
--- Storm Sewer, New
--- New C.I. Water

GOWANDA STATE HOSPITAL		
HELMUTH	NEW YORK	
DRAWN BY GFF	GENERAL ENGINEERING IMPROVEMENTS TO WATER SUPPLY NEW WATER FILTRATION PLANT SITE MAPS & PROFILES	PROJECT NO. 13898
CHECKED BY R.F.H.		SPECIFICATION NO. 13898 G.E.
TRACED BY GFF		DATE APR. 15, 1957
TRACING CHECKED BY R.F.H.		SCALE As Shown
FIELD CHECK BY DBH	STATE OF NEW YORK DEPARTMENT OF PUBLIC WORKS DIVISION OF ARCHITECTURE CARL D. LARSON STATE ARCHITECT	DRAWING NO. 57 5001
APPROVED BY <i>[Signature]</i>		
APPROVED <i>Letter No. 6000 DFD to CHA</i>		
DATE <i>Mar. 19, 1958</i>		

WANDA SECTION CHANGING CHANGE IN CORE WALL

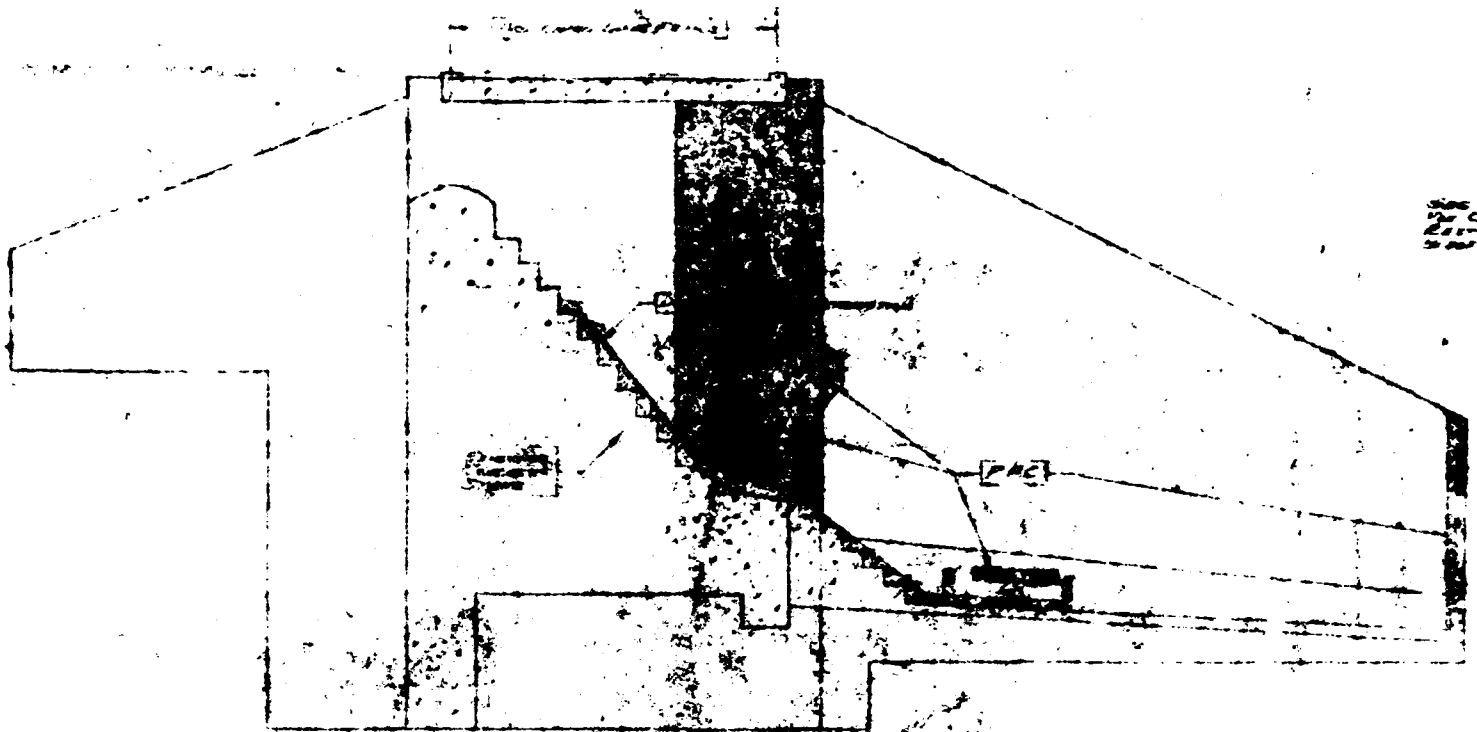
Top of Embankment 1180.0

PLANNED
 (CONT. OF POND)



Continued 7/2/55

1



SECTION THREE
PRESUMPTIVELY REJECTED CONCRETE
DATE: 11-20-60

SECTION THREE
PRESUMPTIVELY REJECTED CONCRETE
DATE: 11-20-60

SECTION THREE
PRESUMPTIVELY REJECTED CONCRETE
DATE: 11-20-60

SECTION THREE
PRESUMPTIVELY REJECTED CONCRETE
DATE: 11-20-60

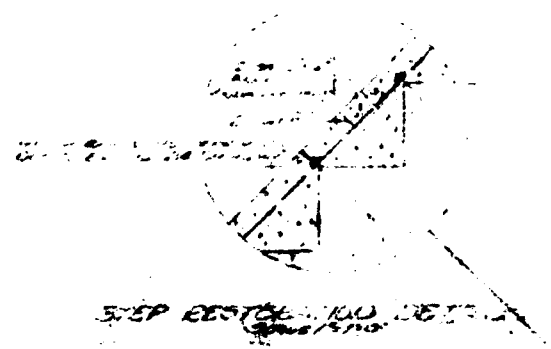


SECTION THREE
PRESUMPTIVELY REJECTED CONCRETE
DATE: 11-20-60

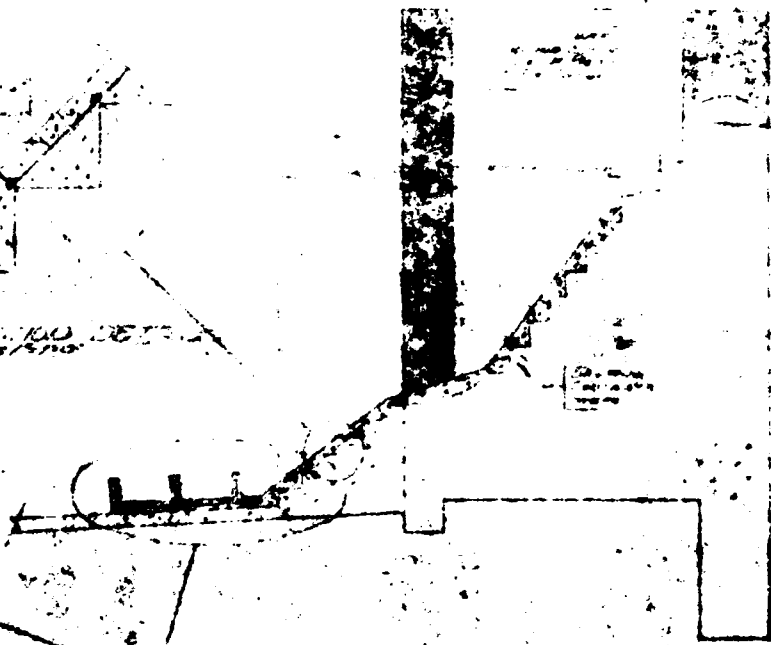
See Detail 1-4
for Column
Reinforcement
to be in place



SECTION B-B



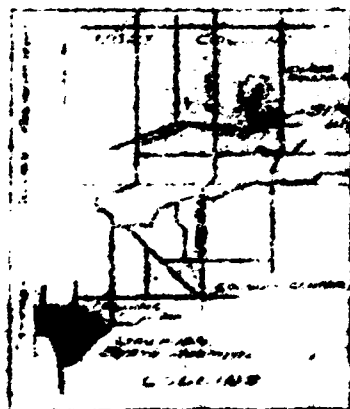
5/8\"/>



SECTION D-D



GOWANDA STATE HOSPITAL	
HEALTH	GENERAL ENGINEERING
1-4	REPAIRS TO BRIDGE & SPILLWAY WATER RESERVOIR
1-5	SECTIONS
1-6	SECTION OF BRIDGE
1-7	SECTION OF SPILLWAY
1-8	SECTION OF WATER RESERVOIR
1-9	SECTION OF WATER RESERVOIR
1-10	SECTION OF WATER RESERVOIR
1-11	SECTION OF WATER RESERVOIR
1-12	SECTION OF WATER RESERVOIR
1-13	SECTION OF WATER RESERVOIR
1-14	SECTION OF WATER RESERVOIR
1-15	SECTION OF WATER RESERVOIR
1-16	SECTION OF WATER RESERVOIR
1-17	SECTION OF WATER RESERVOIR
1-18	SECTION OF WATER RESERVOIR
1-19	SECTION OF WATER RESERVOIR
1-20	SECTION OF WATER RESERVOIR



LOCATION MAP
Scale 1:50,000

LEGEND



FISH CATCH AREA



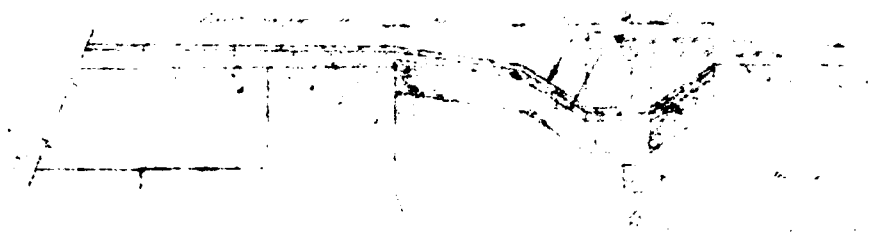
RIVER - PLANTATION AND FISHING CONDUITS IN THE AREA



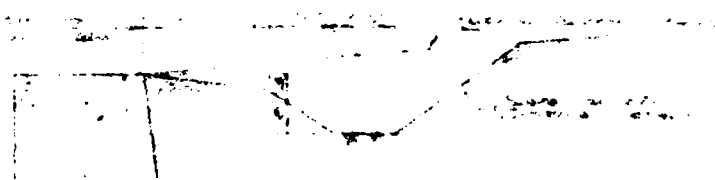
LIVE OR DEAD NATURAL CATCH

PLANTATION
Scale 1:50,000

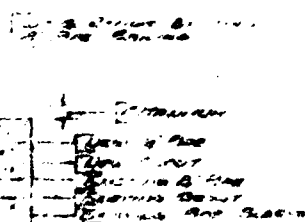
PLANTATION



LET TO THE DEPT. OF DEFENSE, WASHINGTON, D.C.



SECTION TWO: NEW EARTH DRY



PEACE LINE POST EMB: MEAN DETAIL.

CONFIDENTIAL

GOWANDA STATE HOSPITAL		NEW YORK
HELMUTH	GENERAL ENGINEERING	PROJECT NO. 20704
DRAWN BY J. E.	REPAIRS TO BRIDGE & SPILLWAY- WATER RESERVOIR	DATE 2-27-34
CHECKED BY J. E.	PLAN & DETAILS	DATE 2-27-34
WORKED BY J. E.	STATE OF NEW YORK	SCALE AS NOTED
CHECKED BY J. E.	DEPARTMENT OF PUBLIC WORKS	66
FIELD WORK BY J. E.	DIVISION OF ARCHITECTURE	6037
U.S. MAPS		DATE

END

DATE
FILMED

11-80

DTIC